ARCHIVES

OF

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29581

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BY

DR. H. KNAPP
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AND

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ASSISTANT EDITOR

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NOTICE TO OUR READERS.

The ARCHIVES OF OPHTHALMOLOGY contain *original papers* on all branches of ophthalmic surgery, and *original reports* on the progress of ophthalmology. The original papers occupy from two thirds to three fourths of the space, and their scope embraces all subjects of scientific and practical interest connected with this department of medicine.

The object of the ARCHIVES is to guard, solidify, extend, and diffuse the stock of acquired ophthalmic knowledge by recording the constant addition of new observations, investigations, methods and means of examination, clinical experience, instruments and remedies, and further by taking part in the discussion of the questions of the day with a spirit alike conservative and progressive.

Particular attention is paid to the preparation of the Report on the Progress of Ophthalmology. The report is intended to furnish a *complete, systematic and early* review of the current ophthalmological literature of the world. It has been necessary to divide the work of its preparation among a number of collaborators according to the following arrangement:

Dr. H. MAGNUS, lecturer at the University of Breslau (22 Tauentzien Strasse):

1. *General Ophthalmological Literature:*
   - *a.*—Text-books (not abstracts, but notes pointing out what is new and characteristic).
   - *b.*—Monographs and papers on historical, statistical, and general subjects; reports of societies and hospitals.
   - *c.*—Periodicals on our specialty (short notices of their character, time and place of publication, the titles of the original papers, with the names of their authors.)

2. *General Pathology, Diagnosis, and Therapeutics,* including new instruments, apparatus, and remedies.
3. *Normal Anatomy and Physiology,* including color-blindness.

Dr. C. HORSTMANN, lecturer at the University of Berlin (Potsdamer Strasse 4):

1. *Anomalies of Refraction and Accommodation.*
2. *Eyelids.*
3. *Lachrymal Apparatus.*
4. *Muscles and Nerves.*
5. *Orbit and Adjacent Cavities.*
6. *Conjunctiva, Cornea, Sclerotic.*
7. *Injuries and Foreign Bodies of these parts.*

Dr. A. NIEDEN, of Bochum, Westphalia:

1. *Uveal Tract,* including glaucoma.
2. *Refracting Media,* including the lens.
3. *Retina and Optic Nerve.*
4. *Injuries and Foreign Bodies of these parts.*
5. *Ocular affections in connection with general diseases.*

In order to obtain complete and recent reviews on the non-German ophthalmological literature, special reporters have been selected for different countries, who will send monthly abstracts of all local ophthalmological publications to Dr. C. Horstmann, of Berlin, the editor of the Report. Dr. Hortsmann will distribute these abstracts among the German reporters according to the above plan, in order to preserve the systematic arrangement, which we think of paramount importance.

The special reporters are:

For America: Dr. SWAN M. BURNETT 1215 I Street, Washington, D. C.

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In the interest of our readers, who are scattered over the whole world—and whom, like ourselves, we desire to keep informed of all advances in ophthalmology—furthermore in their own interest, authors of ophthalmological works are requested to send reprints, duplicates of journals, or copies for reviewing, to one of the above named reporters, or to the editors or publishers of the Archives, according to their convenience.

The abstracts of American ophthalmological literature formerly appeared under a special head, but are now embodied in the systematic Report. Text-books may be specially noticed.

The number of good papers offered us for publication has increased to such an extent that it is no longer possible to translate all of them unabridged. Whenever a German paper is condensed in the English version, or *vice versa*, it will be so stated. Should any one of our readers wish to recur to the original, the editors will always take pleasure in sending it for reference.

Under the heading of "Miscellaneous Notes," there will be published all kinds of professional news which specially concern the oculist, *e. g.*, appointments, honors, resignations, vacancies, new ophthalmic hospitals, opportunites for instruction, prize questions and essays, announcement of Society meetings, etc. Brief notices of this kind will be thankfully received by the editors.

Original papers of value from any source will, as heretofore, be welcome to the ARCHIVES, and are solicited.

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H. KNAPP, M.D.,
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THE editors and publishers of the ARCHIVES beg to offer some suggestions to authors who propose to favor them with their contributions.

1. As original communications the ARCHIVES can accept only such papers as have neither been printed nor are intended to be printed in other journals. If a preliminary communication on the subject of a paper has been published, the author is requested to state this in the letter accompanying his manuscript. It is understood that contributors to these ARCHIVES and editors of other periodicals, will make no abstracts of the original papers published in this journal without giving it due credit for the same.

2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

3. In preparing manuscript for the compositor it is requested that the following rules be adhered to:

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4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance

EDITORIAL NOTICE.

The steadily increasing number of our regular contributors has made it impossible to give a complete list on the title-page. To avoid injustice, we have thought best to omit the list altogether. Thanking those who have hitherto supported us in editing these ARCHIVES, we trust that they will continue to favor us with their contributions.

C. SCHWEIGGER,
H. KNAPP.

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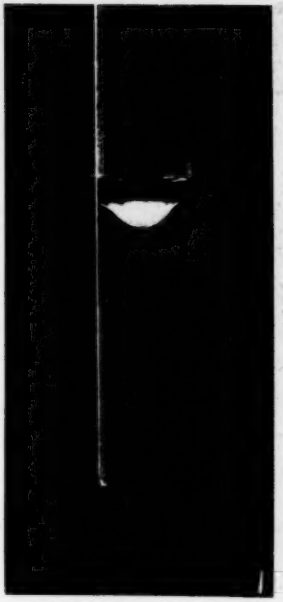

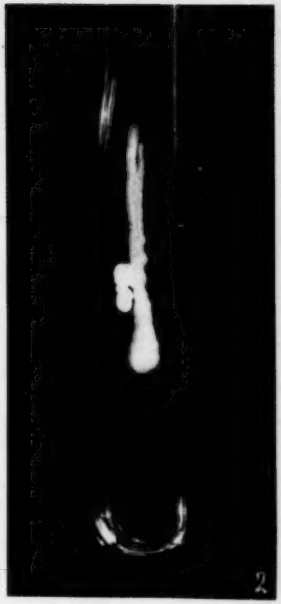
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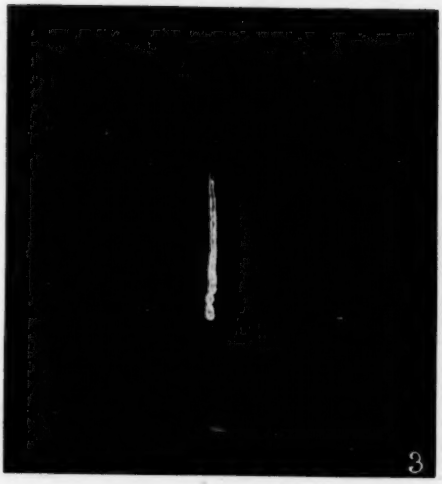
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ARCHIVES OF OPHTHALMOLOGY.

THE DESCRIPTION OF AN ADENOMA OF THE CARUNCLE.

A CONTRIBUTION FROM THE LABORATORY OF THE ALUMNI ASSOCIATION OF THE COLLEGE OF PHYSICIANS AND SURGEONS, N. Y.

By T. MITCHELL PRUDDEN, M.D.,

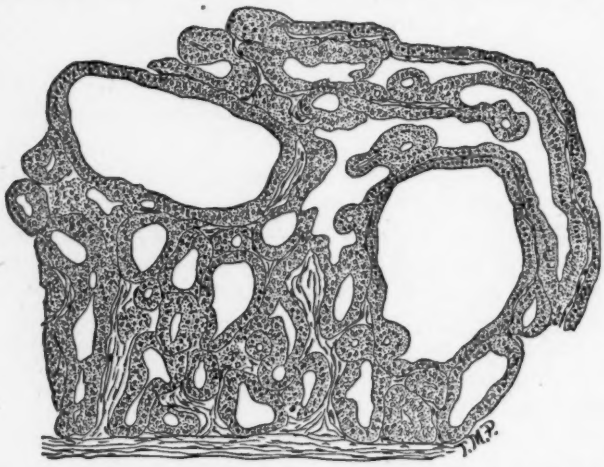
DIRECTOR OF THE LABORATORY; PATHOLOGIST TO THE MANHATTAN EYE AND EAR HOSPITAL, NEW YORK.

THE small tumor was removed at the eye clinic of the College of Physicians and Surgeons, New York, by Prof. Agnew, to whom the writer is indebted for the specimen. It was removed from the inner canthus of the left eye of a woman seventy-four years of age, and had been growing slowly for seven years. It had given rise to inconvenience, but had caused no pain. It occupied the position of the caruncle. The gross and microscopical appearances which it presented after removal are as follows:

The tumor is globular in form, about 4 *mm.* in width and 5 *mm.* long, reddish and soft. On hardening in alcohol, it shrinks slightly, but preserves its general shape. On a transverse section through the middle of the growth, three tolerably distinct portions are visible to the naked eye: 1st, the tumor is surrounded by a thin dense portion having the appearance of a capsule; 2d, the mass of the tumor, which is spongy in texture, and presents along the middle 3d a long, irregular, branching cleft or fissure, running from side to side.

On *microscopical examination*, the central spongy portion, which makes up most of the mass of the tumor, is seen to consist (see fig.) of a congeries of tubular branching struc-

tures, having larger and smaller, mostly central, lumina, and running in all directions. These structures, which resemble tubular follicles, and are lined with cuboidal and cylindrical epithelium, appear to be without distinct membranæ propriæ. Between the follicular growths is a small amount of loose fibrillar connective-tissue stroma, containing a moderate number of flattened cells and a few thin-walled blood-vessels. The calibre of the lumen of these follicles is very variable. In some of them there is a small round opening, as seen on transverse section, while some are widely dilated, forming globular or irregular shaped cyst-like cavities, some



of which are empty, some filled with granular material and fragments of degenerated and disintegrated cells. The general character is that of an atypical growth of branching tubular glands. The above-mentioned central fissure appears to be one of the much-dilated irregular tubules, being lined with epithelium similar to that lining the smaller tubules. The glandular mass is surrounded by a compressed capsule of connective tissue, which contains a considerable number of dilated blood-vessels, and at one side a small cluster of fat cells. Among these fat cells are seen sections of tubules resembling the excretory portion of sweat glands.

In the connective-tissue capsule near the periphery are seen portions of a few hair follicles and small sebaceous glands. The whole is covered, except at the surface of attachment to the underlying tissues, with epithelium which presents the usual characters of that covering the caruncle, except that it is in places moderately thickened. No trace of the ordinary caruncular glands—the modified sweat glands of the Germans—can be found unless the above-mentioned excretory portion running through the fat tissue toward the surface may be considered as such.

The tumor is accordingly an *Adenoma of the Caruncle*, apparently originating in the caruncular glands.

The lesions of the caruncle as a separate structure have been very little described except in so far as they are apt to be associated with those of the conjunctiva and the plica semilunaris, and the writer has not found in the literature any record of a tumor of this part of the above character. On the contrary adenomata of the lachrymal gland are not so very infrequent. Although there is no intrinsic reason why adenomata of this part should not occur, this tumor seems worth recording partly because of its apparent rarity and partly because of the peculiar nature of the part in which it occurs.

Owing to the multiplicity of structures which the caruncle presents and its—so to say—almost anomalous position, being an islet of skin thrust in on to the conjunctiva, sometimes quite separate, sometimes still connected with adjacent dermal structures; and furthermore, owing to the peculiar character of the caruncular glands themselves, which may be regarded as a transitional form of glands from one type to another, the occurrence of such a growth here may have some bearing upon the etiology of tumors in general, since it would tend to confirm the embryonal origin of tumors as suggested by Cohnheim. At any rate, in the present state of our knowledge of the etiology of tumors, the description of every sharply circumscribed tumor of this kind, which is so small and so separated from other similar structures as to permit of a satisfactory demonstration of its exact origin, can hardly be without value.

ISCHÆMIA RETINÆ.

By Dr. S. C. AYRES, Cincinnati.

Ischæmia Retinæ During a Congestive Chill—Complete Blindness Followed by Recovery.

Case 1.—Sidney H., æt. four, lives on the lower Mississippi, at Helena, Ark., and consequently is subjected to the miasmatic influences of that locality. In August, 1877, he had severe chills on three successive days. On the fourth day he had a congestive chill, which lasted over twenty hours. So severe was it that his attending physicians pronounced his recovery an impossibility. During the night, as consciousness returned, he called his grandmother to his side. When she came he said: "Why do you keep me in the dark? it is so awfully dark." They then discovered that he was blind, as he could not see the bright light of a lamp held near him. As soon as he was able to travel his father brought him to consult Dr. Williams. In his temporary absence I examined him, and found the following conditions: He was still very weak and prostrated, and looked pale and emaciated. His parents said that he had improved some since he left home. His pupils were widely dilated and responded slightly to strong daylight. He had barely quantitative perception of light. Ophthalmoscopically the discs presented a pale appearance, like that of the early stages of atrophy. The larger retinal vessels appeared thin and partially empty, but there was no plugging of any of the trunks. The discs were not swollen nor was there any cloudiness of the retina. Tension was normal and the eyes appeared alike. After I had examined him he lay down on a lounge in the room, while I questioned his mother about the case. His face was towards the wall, upon which was a paper with vertical green stripes. While we were talking he said suddenly: "Oh, mamma, I saw the stripes

on the wall paper; but it is all gone now." I questioned him, and found that he had undoubtedly seen the paper, for he had not known what it was like. His mother was instructed to watch him closely to see whether he had any more flashes of sight, and to note how long they continued. The next day he had two or three such flashes, but they lasted only a few seconds. In a few days they came more frequently and lasted longer each time. His field of vision seemed to be contracted, as the area that he took in each time was limited. He was under observation about three weeks, and when he returned home he could see to walk around unaided. There was not much change in the appearance of the discs, but his pupils were more active and responded to the influence of light. His general health was much better, and his strength increased under a tonic treatment with good nutritious food.

Three years later, in 1880, he was again examined. His vision was then $\frac{20}{20}$ with either eye. The discs were still paler than normal, but the retinal vessels were well filled. He had grown considerably, and his general health was quite good.

January 22, 1885, his mother writes me: "He sees almost perfectly, it seems to me, when in a strong light. At night or upon entering a shaded room he does not seem to take in objects as readily as persons who have perfect sight. He is now eleven years old, a large, well-developed boy, well advanced in his studies, and we have no trouble with regard to his studying on account of his eyes."

Ischæmia Retinæ Occurring during an Attack of Facial Erysipelas—Marked Amblyopia—Complete Recovery.

Case 2.—Miss M. J. P., twenty-six, is a delicate, anæmic young lady, with fair complexion, blue eyes, and in height a little above medium. She has never had good health. Her digestion is feeble, and she has headaches frequently.

About three months ago she had facial erysipelas, and during this attack her sight failed. Up to that time her vision for distance was considered perfect, and she had had no asthenopic symptoms in reading, writing, or sewing. Functional examination showed that her vision was only 0.1 in either eye. She cannot read ordinary print, nor can she recognize her acquaintances at a distance. The pupils are active and respond promptly to the influence of light.

The ophthalmoscope revealed no marked change in the fundus, except in the discs. The arterial and venous trunks appeared normal, but the discs were considerably paler than normal.

I decided to try the influence of strychnia hypodermically, and accordingly injected $\frac{1}{15}$ gr. in the arm. Sept. 18th, the injection has been used three times, and to-day V = 0.3, r. and l. Sept. 19th, V = 0.5; injection repeated. Sept. 20, V = 0.6, both eyes. Sept. 22d, V = 0.7, r., and 0.8, l., and can read Sn. 1½. Sept. 24th, V = 0.9, r. and l. separately, and 1 with both eyes together. Oct. 24th, V = 1, r. and l., and she can read Sn. 1. She was seen the latter part of December, and vision was perfect in either eye, and she could read Sn. 1. Her health was somewhat improved, and since her last visit she had been using her eyes without fatigue.

In the first case there was probably some malarial influence, which overwhelmed him and caused unconsciousness from its influence on the brain. Congestive chills in the far South are sometimes so severe as to cause death in a few hours. In my experience in the service during the late war, while stationed at New Orleans, La., I saw such cases in so aggravated a form that death resulted in from twelve to twenty-four hours. In violent cases which recovered there was occasionally hebetude of the mind, which lasted for a long time afterwards. I cannot now recall any cases of blindness from congestive chills, but I think it more than probable that such results are on record. There was no embolism in this case, as the retina did not present the peculiar appearance characteristic of that condition. So pronounced was the atrophy of the discs, that I was about to tell the mother that her boy was permanently blind, when he saw the stripes on the wall-paper as described. The flashes of sight showed that there was some obstruction which was for the time being relieved, thus allowing the retina to again perform its function. Was it a serous effusion pressing on the chiasm, or was it a hemorrhage? Probably the former. As the elimination of the malarial poison progressed and the effusion was absorbed, so his vision returned.

In the second case the erysipelas reduced the strength of an already delicate young lady, and caused an insufficient

nutrition of the retinæ. We might call it anæsthesia of the retina, were it not for the change in the appearance of the discs. When I saw her last, three months after the treatment, the discs were slightly paler than normal, although vision was perfect.

This case is analogous to one reported by Dr. H. Knapp, which I append, but the causes were different.

In the *Trans. of the 16th Meeting* (1880) *of the Am. Oph. Society* Dr. H. KNAPP reported—

A Case of One-Sided Complete Blindness from Ischæmia Retinæ Ending in Perfect Recovery.

The patient, a young lady of thirty, had been in constant attendance upon her father for several months until his death, when she was quite feeble, having lost considerable flesh. She noticed flashes of light and scintillation in the *left* eye, and finally an obscuration, first of the upper half of the visual field, and four days later of the lower half, with total blindness. The optic discs looked abnormally pale, and both arteries and veins were swollen and less numerous than usual. The diagnosis of insufficient nutrition of both retinæ, which in the left eye had been of such a degree as to completely suspend the visual function, was made.

She was ordered lactate of iron, generous diet, milk punch, and two hours morning and afternoon in Central Park. In the course of six weeks the recovery was complete, vision being perfectly restored. Her optic discs were then abnormally pale, but less so than at the beginning of the treatment. He does not attempt to explain why she did not lose vision in both eyes.

A RARE FAMILY HISTORY OF CONGENITAL COLOBOMA OF THE IRIS, ETC.

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I WISH here to relate, in detail, the family history referred to by Prof. W. W. Seely in the discussion following the paper on "Multiple Colobomata of the Iris," by Dr. W. F. Mittendorf, in the "Transactions of the American Ophthalmological Society," 20th Annual Meeting, 1884, at p. 738. (In that discussion this family history was referred to as one of *polycoria;* this was, however, a mere *lapsus linguæ*.)

But one member of this family is known to me from personal examination; and his history and present condition I will give first. Seven members in all, so far as I can ascertain, were affected; the anomaly occurring in two generations.

Jeremiah C. Payne (166 W. Eighth St., Covington, Ky.), æt. eighty. P. accurately describes the external appearance of his eyes, and his subjective symptoms during youth and manhood. He had a coloboma of the iris in both eyes. The colobomata were directed downwards and slightly inwards; and were about as wide as an ordinary pupil. Their sides were almost parallel, only slightly converging; and they reached completely to the corneal border. The pupil possessed a certain amount of reaction to light, but less than in a normal eye.

His vision was always extremely poor. He used for reading a pair of very strong convex glasses. Upon visiting him I found a pair of these old glasses, and examined they proved to be + 2½. When reading he used apparently but one eye (by preference the

right), and the book or paper was held very close, high up, and to the nasal side. His eyes now do not indicate any considerable degree of microphthalmus ; so it is a reasonable assumption that there existed a congenital luxation of the lens. His vision was always so poor, that my questions to elicit whether any power of accommodation was ever present or not, produced only very unsatisfactory answers ; so far as they went, however, they rather negatived this fact. He states, moreover, that he was told by friends that his irides were tremulous. He describes a curious subjective symptom, which was constant as long as he could see at all. When looking at any bright object, as a light or the moon, he perceived a series of very indistinct false images, partially blending together, and arranged in a semicircle above the true image. The most ready explanation of this phenomenon is that it was produced by the irregular upper margin of the partially dislocated lens. A similar phenomenon appeared when reading. The type appeared clean and distinct about the fixation point, and somewhat towards the nasal side, and faded into a rainbow-like blur above and towards the temporal side.

About 1855, or at fifty years of age, his vision began to grow much poorer ; and in the course of four or five years it had diminished so much that only ability to perceive large objects and to go about unassisted, remained. This amount of vision slowly diminished during the succeeding years until only perception of light remained. In 1870 an iridectomy downwards was made in each eye. These soon closed up. About one year later a second iridectomy downwards was made in the left eye. This also soon closed up.

At no time, during all these years, had he any severe pain, or any acute inflammation in either eye.

STAT. PRÆS.—*Right.*—Slight micro-cornea, cornea 10 *mm.* in diam. ; the entire eyeball somewhat atrophic, and tension diminished. Coloboma narrow, ragged, and irregular, the result of the operation of iridectomy. Iris atrophic, dragged downwards and inwards, and adherent to the remnants apparently of an old cataractous, shrunken lens. V = nil, although up to within a few years he had in this eye still the perception between profound darkness and bright sunlight.

Left.—Phthisis bulbi. Cornea opaque and containing some chalky deposits. Grayish exudation nearly filling up the anterior chamber, and containing some chalky plates. An anterior staphy-

loma in the ciliary and equatorial region, upwards and inwards, and occupying the entire space between the internal and superior recti. The sclera here thinned and showing the dark-blue tinge. A similar but larger staphyloma below at the site undoubtedly of the choroidal coloboma, grooved by the inferior rectus, and bulging out to either side of the muscle. Eyeball soft.

Neither eyeball painful nor sensitive to pressure.

FAMILY HISTORY.—Owing to the fact that I have accepted this entire family history upon the statements of one remaining (blind and aged) member of the family, I think it advisable to preface the history proper with the reasons why we may regard these narrations as worthy of implicit credit. I have myself twice, patiently and carefully, noted down the entire history from the old man's lips; once five years ago, and again one year ago. A colleague noted down the history three years ago, during my absence. These three accounts agree absolutely, even to minute details of dates, ages, etc. The old man has that surprising memory for names and dates that we so frequently find among our Western pioneers; which same faculty so often exists among the intelligent blind. In the few instances where I had some check upon the old man's statements I found them perfectly accurate.

FATHER.—Charles B. was a clergyman. Eyes light gray, normal in appearance, and vision good. Fond of hunting and an excellent shot.

MOTHER.—Mary Ann. Eyes dark, normal in appearance, and vision good. Did all the family sewing. Father and mother were not related, and both lived to be over ninety. They had eight children.

WILLIAM H.—About twelve years older than our patient. Vision perfect; he went West, and became a trapper and guide. Died at seventy; no children.

(1). BELINDA.—About ten years older than J. Had iris-coloboma, both eyes, directed downwards and inwards. They were conical, so that she had the appearance of having immense pupils. Pupils reacted. She had better vision than J., and less difficulty in reading. In a dim light she had something of the same optical phenomenon. For example, in looking at the moon she saw three or four very indistinct false images blended into a

halo-like arc above. Probably the lens was dislocated downwards in a slight degree. She died at about sixty years of age, and some years before her death our patient heard that her vision had become very decidedly worse.

(2) SUSAN.—About eight years older than J. This sister had eyes almost identically like those of our patient. The colobomata had the same appearance, perhaps a trifle wider and a little more conical, and vision was equally bad. They could use each other's glasses with equal facility. She held her book while reading just as J. did; but she lacked the optical symptom. At the time of my first examination we made inquiries concerning her, and received some rather vague information. She was then over eighty, and had for many years been entirely blind in the left eye, and almost blind in the right. Some years previous the left eye had been enucleated (why, I could not ascertain), and some time previous an operation (what, I could not ascertain) had been made upon the right eye. This produced only temporary, if any, improvement.

ANN.—About four years older than J. Eyes normal and vision good. Died aged fifty-nine.

(3) JEREMIAH.—Our patient.

PENELOPE.—About five years younger than J. Eyes normal and vision good. Died aged 41.

(4) ABIGAIL.—About ten years younger than J. Eyes in appearance very like those of our patient, only pupils rather smaller and placed lower, and the colobomata rather narrower. Her vision was, however, much the worst of the entire family. Could not read the largest type, even when held close to the eyes and using J's glasses. In the house, upon dark and gloomy days had to feel her way about. She had nystagmus. Died aged twenty.

(5) CHARITY.—The youngest, about sixteen years younger than J. Had coloboma of the iris in each eye, directed downwards. The pupils and colobomata were rather small, and the latter do not seem to have been complete, a very narrow band of iris remaining at the periphery. Her vision must have been good, for she had commenced to learn to spell and read when she died, at the age of six.

SECOND GENERATION.—Belinda had two daughters and a son. Eyes of all normal. All three dead.

Susan had two daughters. Younger normal.

(6) ELDER DAUGHTER.—Had eyes, both in external appearance and as regards vision, very much like those of her mother. Died without children.

Ann had several children. All except one daughter died during childhood. Eyes all normal.

Jeremiah has had two children. One died young, eyes normal.

(7) DAUGHTER SUSAN.—She is now forty years old. Has colobomata of the iris, directed downwards and inwards. The irides are brown. The pupils are very slightly displaced downwards, and have good reaction. The colobomata are about as wide as the ordinary pupil, and somewhat conical. The left is complete, reaching to the periphery; the right has a very narrow band of iris remaining at the periphery. Her vision is very good. I have not seen this daughter, she having gone some years ago to California, but the father has a large, old-fashioned photograph of her; and although the photographer had "retouched" the eyes and attempted to obliterate these defects, this was so poorly done that careful examination shows the above details quite clearly. Moreover, I have had these details corroborated by a neighbor who, as a young man, had such intimate friendly relations with the young woman, that he should be an authority on the subject of her eyes.

Penelope had six children. All normal.

THIRD GENERATION.—Little known. All normal so far as is known.

We can more readily glance over this family history in the following tabulated form:

Father Mother (Normal)	William	- - - - -
	Belinda	Three children (Normal)
	Susan	Daughter Daughter (Normal)
	Ann	Several children (Normal
	Jeremiah	Boy (Normal) Susan
	Penelope	Six children (Normal)
	Abigail	- - - - -
	Charity	- - - - -

REVIEW OF ANALOGOUS CASES.

Cases of congenital anomalies of the uveal tract, which show a distinct hereditary influence, by occurring among two or more members of the same family, or by occurring in successive generations, are rare; but the literature of this subject furnishes a number of examples. The above family, both as regards the number of members affected in the first generation, and the hereditary influence so nicely shown by the defect passing down two separate branches, must, in this respect, take its place first in the literature of coloboma of the iris; and under the more general head of congenital anomalies of the uveal tract it stands second only to the famous case of the Kehl family, in the village of Gravenrode, in Thüringen, and the remarkable family recorded by Galezowski.

Gutbier reports in a Würzburg dissertation ("De Irideremia, seu Defectu Iridis." Diss. ophthal.-inaug., Wircebergensis, 1834) this first family, in which among four generations there occurred ten cases of irideremia, or complete or partial absence of the iris. The following table will show this clearly:

A Kehl, C. (Irideremia)
- B (Irideremia)
  - E (Irideremia) — Normal
  - F (Irid. part.)
    - I (Irideremia)
    - Normal
  - G (Irideremia)
    - J (Irideremia)
    - (K) A monster)
  - H (Irideremia) — Normal
- C (Irideremia) — Normal — Normal
- D (Irideremia) - - - - - -
- 5 Normal

In this family the defect passes to the third and fourth generations in only one line among eight children. Of these ten cases eight were males and two females.

Galezowski reports (*Recueil d'Ophthalmologie*, 1880) a family history that is still more marvellous. In this family twenty-seven cases of irideremia were found in three generations, here the female sex predominating.

(These two families are so remarkable in showing an hereditary transmission that I introduce them here; although they are not strictly analogous to the family I report above, a different anomaly of the iris existing.)

Mother (Irideremia)	Daughter (Irideremia)	Not known
	Daughter (Irideremia)	Twelve children (ten now dead) *all* irideremia
	Daughter (Irideremia)	Two children *both* irideremia
	Nine other children (now dead) *all* irideremia	- - - -

Streatfield reports (*Roy. Lond. Ophth. Hosp. Rep.*, vol. i., p. 153, 1858) a family history more nearly parallel to this I report than any other I have found in the literature. Here two brothers were affected with iris-coloboma; and one of these transmits it to his son and grandsons—together seven cases, all males.

Brother - - - - - - - - - -		
Brother	Son	Grandson
		Grandson
	Daughter (Normal)	Grandson
		Grandson

In the grandsons the colobomata were either small, or were only deep notches; or, as in one eye of one, a mere notch with a band looking like a cicatrix running downwards from it. As V was very good in all, the defect was probably limited to the iris, as was the case in those that came under examination.

Rosas reports (*Handbuch der theoretischen und praktischen Augenheilkunde*, Bd. i., p. 283, Wien, 1830) the case of a mother with iris-coloboma in both eyes, among whose five children two were similarly affected, one having iris-coloboma in the right, and the other having it in both eyes.

Stoeber reports (*Gazette médicale de Strasbourg*, 1844) the case of a man who had lost his right eye by an accident. His daughter had microphthalmus with coloboma of the iris in the left eye. Her elder son had microphthalmus with iris-coloboma in both eyes, and her younger son had the same defects in the right eye.

Cunier reports (*Annales d'Oculistique*, 1845) an interesting family history. A man (normal) whose grandmother was a deaf-mute married a woman (normal) whose mother had microphthalmus. They had two daughters; the first had microphthalmus in both eyes, while the second had microphthalmus with irideremia

totalis, and was a deaf-mute. The first daughter has a son who is a deaf-mute, and has microphthalmus in both eyes with coloboma of the iris in the right.

Gescheidt reports (Ammon's *Zeitschrift für Ophthalmologie*, Bd. 4, 1834) the case of a man with iris-coloboma whose fifth child, a daughter, also had iris-coloboma, the older children being normal.

Stilling reports (Ammon's *Zeitschrift*, Bd. 5) the case of a girl with iris-coloboma, one of whose parents had the same defect.

Ewers reports ("Zweiter Jahresbericht über die Wirksamkeit der Augenklinik," Berlin, 1872) a case of coloboma of the iris and choroid where the mother was known to have coloboma of the iris.

Two other cases of the same defect observed by him occurred in a brother and sister.

Gleitsmann reports (*Ueber ein Colobom der Chorioidea*, Inaug.-Diss., Greifswald, 1874) the case of a girl with coloboma of the iris and choroid, in both eyes, whose mother has iris-coloboma in the right eye.

Streatfield reports (*Roy. Lond. Ophth. Hosp. Rep.*, vol. i., p. 154) the case of a man with iris-coloboma, both eyes, whose sister and two cousins have the same defect. He stated that his grandfather had the same defect, but the direct transmission could not be traced.

Fichte reports (Henle und Pfeufer's "Zeitschrift für rationelle Medicin," N. F., Bd. 2) two cases of iris-coloboma occurring in children in the same family.

Hoffmann reports ("Ueber ein Colobom der inneren Augenhäute ohne Colobom der Iris," Inaug.-Diss., Bonn., 1871) a case of a woman with choroidal coloboma, whose brother has coloboma of the iris and choroid.

Marty reports ("Contribution à l'étude du coloboma de la choroide et de l'iris." Thése de Paris, 1880) two cases of coloboma of the iris and choroid in both eyes in a brother and sister.

Hirschberg observed Becker ("Zur Anatomie der gesunden und kranken Linse," p. 136; da Gàma Pinto, *Archiv. für Augenheilkunde*, vol. xiii.) the case of a woman with coloboma of the iris and choroid, whose brother had coloboma of the iris, choroid and optic nerve.

(The following cases were not accessible to me in the originals; the references are taken from: Gescheidt, "De colobomate

iridis," Lipsiæ, 1831; Rau, "Die Krankheiten und ursprünglichen Bildungsfehler der Regenbogenhaut," Bern, 1845; and Wilde, "Essay on the Malformations and Congenital Diseases of the Organs of Sight," London, 1862.)

Bartholinus ("Acta medica et philosophica Hafniensia," 1673) describes and figures a case of iris-coloboma which was hereditary.

Block mentions ("Medizinische Bemerkungen," Berlin, 1774) a family in which the father, his children, and his nephews and nieces had coloboma of the iris. In one daughter and in one nephew the defect occurred in but one eye, in the rest it was present in both eyes.

[The cases described by Helling (Berlin, 1821) and by Rudolphi (Berlin, 1823) belong to this same family.]

Hagström reports ("Abhandlungen der königlichen schwedischen Academie der Wissenschaften," Bd. 36, Leipsig, 1781) a whole family in which each member had iris-coloboma.

Acrell (in the same vol.) reports a case of iris-coloboma which was hereditary.

Conradi knew ("Handbuch der pathologischen Anatomie," Hanover, 1796) a man whose father, sister, and niece had coloboma of the iris. That is to say: father, daughter, and granddaughter in line.

Erdmann reports ("Zeitschrift für Natur- und Heilkunde," vol. iv., Dresden, 1826) a man with coloboma of the iris, both eyes. He had had six children. Of the two living, one, a boy, had the same defect, both eyes. Of the dead children, one, a boy, was known to have had iris-coloboma, both eyes.

Heyfelder reports ("Abhandlungen der Leopoldina Carolina Akademie der Naturforscher," vol. xiv., Berlin, 1829) a family where the mother had iris-coloboma, both eyes. She had three children; the first two, twins, one was normal, the other, a boy, had the same defect, both eyes; the younger child, a girl, had iris-coloboma, both eyes.

Himly has observed in one instance three children in one family affected with iris-coloboma; and in another instance he has observed a father and a son both presenting this anomaly.

This same hereditary influence has been noted in cases of *irideremia* reported (in addition to the above two) by Henzschel, Focachon, Ruete, Cooper, Schröter, Laskiewicz-Friedensfeld, Page, Benton, Rainsford, Wells, Heuner, and Streatfield.

In cases of *corectopia* reported by Schwartz, Mooren, Williams (E.), Graefe, Frickhöffer, Wells, Schaumberg, and Breitbarth.
In the case of *polycoria*, mentioned above, by Mittendorf.

REMARKS.

I have taken the pains to call attention to what material exists in the literature, within my knowledge, clearly and unmistakably showing a distinct hereditary influence, because Prof. Manz, the greatest living authority upon this subject, treats this influence lightly and is somewhat disposed to doubt its importance. In the second volume of Graefe and Saemisch's "Handbuch der gesammten Augenheilkunde," in his chapter "Die Missbildungen des menschlichen Auges," at p. 86, he refers to this point as follows: "With this anomaly, its presence in several members of one family is of especial interest, for here, at once, the etiological influence of heredity is conceivable. And in fact observations are not lacking where this anomaly was found in several members of the same family and also in parents and children. These latter cases, which especially would speak for inheritance, appear, however, to occur seldom. However prone one may be, in these congenital anomalies, to think of heredity; however impressive the individual positive cases in question may be; still they are far too few to allow of the basing upon them of any particularly trustworthy etiological factor."

When we consider, however, the relatively limited number of cases which form the sum-total of our recorded observations, and can find among these the number above quoted, where the hereditary influence is shown clearly and unmistakably, we are compelled, I must believe, to recognize the existence of some sort of disturbance which has an hereditary influence, however vague and indefinite our ideas may be as to what this influence really is, or how it acts.

Arlt long ago insisted on the influence of heredity in these cases, and even was so explicit as to state that it came generally from the paternal side. However, among twenty-six examples recorded above, ten were direct from the

father and eleven direct from the mother; two indirect through the father, and three indirect through the mother; the few remaining cases were too indefinite to ascertain this relation. From this it would seem that neither sex has any preponderating influence.

Even experimental results give weighty evidence in favor of this view. Deutschmann has reported (Zehender's *Monatsblätter für Augenheilkunde*, 1880) the following remarkable example. Two rabbits were paired: the male had received a tubercular inoculation in the anterior chamber, and the iris tubercle had left an atrophic segment in the lower part of the iris; the female had merely received an injection of some indifferent material into the vitreous. Of a litter from this pair, one had different colored irides in the two eyes; and another had a coloboma of the iris and choroid in both eyes.

This is, so far as I know, the only case of iris- and choroidal coloboma that has been produced, but Deutschmann, Samelsohn, and Brown-Séquard have produced other anomalies (more particularly microphthalmus) by similar experiments.

There is one point in these cases to which, on account of its important practical bearings, I wish to draw particular attention, and that is as regards the gloomy prognosis where the defect is, in any way, of considerable extent. Arlt and some of the older authors hint at this danger, but no particular stress has, in recent years, been laid upon this point. We recognize this condition at once as a congenital malformation, and dismiss it as such without further consideration. A study of the literature convinces me that quite a large proportion of these cases terminate in blindness in later years, and if these cases could, as a rule, be kept under observation, I believe that this would be demonstrated much more frequently than it has been in the past. This seems to result from a very slow and insidious form of chronic inflammation, or degeneration, attacking the uveal tract, and very prone, among other changes, to produce secondary cataract.

The results of the few histological examinations that

have been made of colobomatous eyes bear testimony in this direction.

Haase reports (Graefe's *Archiv für Ophthalmologie*, Bd. xvi., 1870) the first examination of this kind, made upon an eye removed by Laurence (St. George's Hosp.) on account of threatening sympathetic inflammation in the other eye, in a girl of fifteen. The sclera was thin and bulging at the coloboma and thickened at its borders; choroid somewhat atrophic, vessels small, with their walls thickened, and a richer development of vessels at the borders of the coloboma; choroid covering the coloboma thin and atrophied; retina here lacking, at other places showing calcareous patches, only at few points the normal retina still remaining; vitreous infiltrated; optic nerve atrophic.

Hirschberg reports (*Centralblatt für praktische Augenheilkunde*, p. 265, 1881) the results of the anatomical examination of such an eye. The eye was painful and sensitive to pressure. The lens was opaque and V was destroyed. Enucleated the eyeball showed the changes of phthisis bulbi, a result of cyclitis. Cornea showed new vessels; sclera thinned and staphylomatous below; iris atrophic and adherent to the cornea and the lens; ciliary body atrophic and showing inflammatory products; choroid atrophic, over the coloboma a mere membrane with remnants of the normal structures and devoid of pigment; retina completely detached and atrophic; lens opaque and shrunken; vitreous fluid.

In deciding whether this cyclitis and the resulting changes have occurred in this colobomatous eye merely as a coincidence, or whether the coloboma stands as the causal factor, Hirschberg holds to the latter view.

Da Gama Pinto describes (*Archiv für Augenheilkunde*, vol. xiii., Wiesbaden and N. Y.) another eye removed by Hirschberg. This eye had been blind for a year, and was painful and sensitive to pressure. The iris was hypertrophied and adherent to the cornea at the periphery; ciliary body showed a previous cyclitis; coloboma was covered with a fibrillar membrane of connective-tissue continuous at the borders with the choroid, retina, and optic nerve; sclera here bulged somewhat and showed changes; choroid pigmented, thickened, and the capillaries congested; there were numerous colloid excrescences; retina is detached and degenerated; vitreous degenerated,

fibrillated, and vascular; lens semi-transparent, with capsular cataract; optic nerve atrophic.

Arlt (*Krankheiten des Auges*, Bd. ii.) and several of the older authors have found similar changes existing to a greater or lesser extent; but the cases were not examined microscopically.

Conversely, in all of the few cases of colobomatous eyes that have been examined from very young children, these secondary inflammatory changes do not seem to have occurred.

Gescheidt examined (Ammon's *Zeitschrift für Ophthalmologie*, Bd. 4) the eyes of a child six months old. He reports sclera, choroid, retina, and vitreous normal (macroscopically, I suppose).

Pause examined (Graefe's *Archiv für Ophthalmologie*, Bd. 24) the eyes of a female infant who died at birth. She had a coloboma of iris and choroid. The sclera, choroid, and retina were found to be normal under the microscope. The pigment-epithelium being deficient in pigment over the coloboma, as the only anomaly existing in the fundus: "Eine partielle Leucosis des Pigmentepithels."

Manz examined (Zehender's *Monatsblätter für Augenheilkunde*, 1876) the eyes of a little child who died in the Rostock Clinic. Attention is, to be sure, directed particularly to the histological character of the floor of the coloboma; but no pathological changes of importance in the various tissues are mentioned.

Clinically the development of such changes as I describe have been observed in quite a number of cases reported in the literature of this subject.

The older authors, Bloch, Beer, Rathke, Lechla, Helling, M. Jaeger, Jüngken, Wutzer, Gescheidt, Romberg, Schoen, Ammon, Fichte, and Sichel, call attention to the tendency in eyes affected with iris-coloboma to the development of cataract; but they do not in all cases draw a sharp distinction between iris-coloboma and irideremia, which is so frequently associated with congenital cataract, or results in the development of cataract; and corectopia, which being so often associated with ectopia lentis, shows this same tendency.

In the above family which I report, the three members who reached a ripe old age all became blind late in life. In one of

these, at least, and most probably in the other two also, from the chronic changes above described.

Another case has come under my observation—the patient from whom Jaeger made his drawings of coloboma of the choroid ("Beiträge zur Pathologie des Auges," zweite Auflage, T. xlv. and xlvi.; and the "Ophthalmoscopischer Hand-Atlas," Figs. 87 and 88); she being at that time thirteen years of age. I saw her in Vienna in 1883 in Dr. Dimmer's ophthalmoscopic class. Now over forty, her right eye (T. xlvi. and Fig. 88) presented just these changes above described, the result of an insidious chronic uveitis. Secondary cataract had supervened, and the fundus was no longer visible. V was nil; but the eyeball not painful.

Arlt had seen (*Krankheiten des Auges*, Bd. ii., p. 123,) eight cases of iris-coloboma; and in three of these an opacity of the lens had later supervened.

Dixon reports (*Roy. Lond. Ophth. Hosp. Rep.*, vol. i., p. 108,) a case of iris-coloboma where the vision, previously good, began to fail at the age of twenty-six. At forty the right had a chalky lens; the left a hazy lens with still fair vision.

Leber reports (Nagel's *Jahresbericht über Ophthalmologie*, p. 223, 1870) a case of a man with choroidal coloboma who came complaining of a gradual impairment of vision. There was an extensive defect in the field of vision, much larger than would correspond to the coloboma.

Heyl reports ("Report of the Fifth International Ophthalmological Congress," Phila., 1876) a case of a man aged fifty-one with iris-coloboma and notching of the lens below. In the L E sight had been lost for some time; pupil occluded, and lens opaque and calcareous. R E media somewhat cloudy, and vision failing.

Williams (E.) reports (in the above discussion) a case of a woman, aged thirty, with iris-coloboma. The lenses became luxated downwards. Kept under observation they became opaque, were mostly absorbed, and with proper cataract glasses good vision was secured.

Higgins reports (*Lancet*, Dec., 1877) a case of a man, aged fifty-seven, with iris-coloboma and cataract in both eyes. The right had been blind for forty years, the left since a few months. After extraction a choroidal coloboma was found in each eye. The right set up iritis and the pupil closed; the left had

a subsequent hemorrhage into the vitreous, but finally secured V = ⅛ with + 12 D.

Marty's cases (quoted above). The sister's vision, always poor, began to fail after twenty. She is blind, with cataract, in the right; and vision is very poor in the left. The brother, always "near-sighted," lost his vision gradually. Now blind, with cataract, in the left; and very poor vision in the right.

Badal reports (*Gazette des Hôpitaux*, Mai, 1880) the case of a man with iris-coloboma and cataract. He had been operated upon in one eye twenty years previous, and lost it by irido-cyclitis supervening. In the other eye was a fully developed cataract, which had possibly been a congenital zonular cataract; at any rate, it had become completely opaque in later years. After extraction a large choroidal coloboma was found.

Hirschberg's first case (quoted above) was in a woman of twenty-four. Owing to a lack of intelligence on the part of the patient, it could not be determined how long these chronic changes had been going on.

In his second case, examined by Dr. da Gama Pinto, also quoted above, the patient was a woman (an adult, but age not given) whose eye had been blind for one year.

In quite a number of other cases in the literature is the presence of cataract or some of the other above-mentioned changes noted; but the details are not given with sufficient definiteness to determine accurately when or how these changes developed.

Schoen, Fichte, Talko, and Kipp of Newark, N. J., have seen cases of coloboma of the iris or choroid in which glaucoma or cataracta glaucomatosa supervened late in life.

Another point of practical importance that even this meagre array of cases seems to furnish, is that operative measures on eyes of this character are very prone to result disastrously, or are very likely to prove of negative or only temporary value.

These cases will harmonize very well with the views of Deutschmann, although his view is not necessary to their explanation, or essential to this discussion. Deutschmann examined (Zehender's *Monatsblätter für Augenheilkunde*, 1881) the eye of a rabbit in which there was a coloboma of the iris and choroid. In the region of the coloboma of the choroid he found distinct signs of a sclero-choroido-retinitis,

which had not yet disappeared. This led him to the explanation of the origin of the coloboma as resulting from the arrested development of the eye due to this intra-uterine inflammation; this inflammation at this point in the embryonic eye preventing the closure of the fœtal cleft, or allowing it to again open. It can then readily be conceived, and this explanation for these very cases seems most happy, that a coloboma originating in this manner from original inflammatory changes at this point, would be prone to be the starting-point of future inflammation.

EXPERIMENTS ON THE ACTION OF BACTERIA ON OPERATIONS OF THE EYE.

By H. KNAPP.

AT the end of a systematic bacteriological course in Koch's laboratory, in Berlin, I received pure cultures of pyogenous microbes — namely, staphylococcus pyogenes aureus, albus, and citreus, bacillus pyogenes fœtidus, and the micrococcus of osteomyelitis. With these I made (first at the Hygienic Institute, afterwards in the Anatomy Building, where Prof. Waldeyer and Dr. Hans Virchow kindly put sufficient room at my disposal, and obliged me besides by manifold instruction, although chiefly in another field) a series of experiments on rabbits, in order to ascertain **how a pure wound differed in its healing process from an infected wound.** The experiments were conducted in this way: first, I made a pure operation on one eye, using, however, no chemical agents but operating on a clean, healthy eye with clean hands and instruments— *i.e.*, aseptically, not antiseptically, and, after the operation, leaving the eye alone without a bandage. The other eye was operated upon in the same way, consequently subjected exactly to the same traumatism, but inoculated one way or other, with a pure-culture of bacteria. In so doing, I imitated the chief operations that are practised on the human subject, and desire to premise the remark **that all eyes operated on aseptically recovered, whereas almost all of those infected with the above-mentioned microbes were lost by suppuration,** only those getting well in which the operations had been superficial and limited. Further, I inoculated several eyes with a fermentation-fungus, that of

pink yeast. This microbe produced transient parenchymatous inflammation, but no suppuration. The experiments thus furnish illustrations of the action both of pyogenic and non-pyogenic fungi. I will first describe the different operations and their results, and afterward discuss them comprehensively in the light of the literature pertaining to the subject.

a.—EXPERIMENTS WITH A NON-PYOGENIC FUNGUS.

EXPERIMENT I.—*Nov.* 24, 1885.—I contaminated an incision through the cornea of a rabbit with a pure culture of the white pyogenic staphylococcus. On the next day I found the pronounced picture of purulent panophthalmitis. The profuse secretion, containing micrococci, was used for several plate-cultures which developed well and, inoculated on other rabbits, again produced purulent inflammation. Of the plate cultures I took test-tube cultures, which on agar reproduced the staphylococcus in a brighter white color than the original which I had received on gelatine. An agar puncture-culture, taken from the plate after seven days, developed on the surface into a most beautifully pink, inodorous little disc. As it differed from the other cultures only in color, I considered it to be a variety of staphylococcus pyogenes and used it in the following experiment.

Dec. 9, 1885.—After instillations of cocaine (which was used in all experiments), I made with the Graefe cataract-knife an incision through the upper part of the cornea and iris. The iris protruded. The wire speculum was removed, and the eye left so.

The right eye was operated in the same way, but a small quantity of the pink fungus was put into the wound with a loop of platinum wire, previously brought to a glow. This eye, like the other, was left without a bandage.

Next morning both eyes looked materially alike. There was no secretion in the left; a small flake of mucus lay on the wound in the right. No injection; the upper part of both corneæ somewhat diffusely gray; centre and lower part of each was clear. The iris filled both wounds without irritation; the pupils were black, and the irides within the eye normal. Both eyes recovered, with a leucoma along the section, in ten days.

Two puncture cultures in peptonized meat-water gelatine were taken from the flake of mucus on the wound of the

right eye. They developed feebly into several white points. The first test-tube contained a pink coat on the surface and two slightly yellowish points in the interior of the gelatine. Both, examined later under the microscope, proved to be pure accumulations of yeast-cells, which had not yet liquefied the gelatine in the least in nineteen days. Some puncture-cultures, taken from the depth of the wound canal, liquefied the gelatine, and under the microscope were discovered to consist exclusively of cocci.

EXPERIMENT II.—On the same day a guinea-pig was operated on in the same manner. The next day no secretion on the left eye; some mucus on the right; both wounds slightly gaping; the adjacent cornea diffusely gray, more on the right (infected side) than on the left. The wounds closed in five days; the corneal opacity of the left eye disappeared completely; that of the right left a simple speck in the upper part.

Two test-tube cultures, taken from the mucous secretion of the right eye the day after the operation, the one in gelatine, the other on agar, developed into a white thread in the gelatine, and a white, somewhat waxy-looking coat on the agar. The gelatine was liquefied and covered with a dirty white, offensive coat, which in one place looked reddish-yellow and consisted of irregular débris of cells. Microscopically only very small cocci were found, about half of which lay together in pairs.

Some fresh cultures in agar and gelatine were taken from the pink fungus of the puncture in experiment I. They developed quickly and beautifully in the pink color of the original. The gelatine was not liquefied, nor, of course, the agar.

The white coat on the peptonized meat-water agar was a mixture of cocci and short bacilli.

EXPERIMENT III.—*Dec.* 16, '85.—Middle-sized rabbit. On the left side extraction of the lens with extensive prolapse of vitreous, brought about intentionally; on the right side extraction of the lens with section through the iris, without loss of vitreous. A small quantity of the pure culture of the pink fungus on agar was introduced through the wound into the anterior chamber of the right eye. The rabbit drew the nictitating membrane over the cornea causing the corneal flap, raised by the prolapse of vitreous

in the left eye, to apply to the posterior lip of the wound in about an hour.

Next day the wound of the left eye was free from irritation and almost closed. The wound of the right eye was gaping and covered with some mucus. The upper part of the cornea diffusely gray, not white.

Both eyes recovered about equally well in two weeks. No irritation, no ciliary injection,—two test-tube cultures of the limpid liquid in the anterior chamber of the right eye did not develop.

This eye also remaining free from suppuration, the conviction forced itself upon me that the pink fungus must differ from the other kinds and be benign. On examination, under the microscope, I found at the first glance that it was no schizomyces at all but a fermentation-fungus (*Sprosspilz*, sprouting fungus), according to its aspect and all its reactions the common pink torula, the fungus of the pink yeast, which in Koch's laboratory I had cultivated and examined often enough. Nevertheless, I inoculated with a pure culture of it

EXPERIMENT IV.—On *Dec. 17th.*—Another eye after extraction of the lens. To make a test case of this experiment I stroked the whole wound with the fungus and introduced a quantity about the size of a pin-head into the anterior chamber. The next day I found the wound closed, clean, covered with some mucus which consisted of phlegm corpuscles and a few yeast cells. Some mucus on the edges of the lids. No swelling of the conjunctiva. Cornea clear. No blood in the anterior chamber. No suppuration. The eye recovered with formation of a secondary cataract, posterior synechiæ, and bulging iris.

These four experiments show distinctly that the fungus of the pink yeast is not pyogenic. All the wounds infected with it healed in the same way as those which resulted from clean operations done on the fellow eye, with this distinction only that the harmless foreign body was cast off with the formation of a small quantity of mucus. When I spoke to Dr. George Frank, one of the assistants in Koch's laboratory, of the results of these experiments, he told me that the pink torula was abundantly present in the

air of the laboratories in Berlin. Although this widespread fungus entered as a contamination into one of my cultures, I was very much interested by the course of the inoculations I made with it, for it furnished a clear demonstration of the fact that a microbe resembling pyogenic schizomycetes both macroscopically and in cultures (with the exception of not liquefying nutrient gelatine) may totally differ from it in its action on living animal tissues.

b.—EXPERIMENTS WITH PYOGENIC FUNGI.

EXPERIMENT V.—*Discision. Injection of osteomyelitis fungus into the anterior chamber. Panophthalmitis.*

On *Dec.* 18, '85, I made with a Graefe cataract-knife a discision of the lens in both eyes of a middle-sized rabbit. With a Koch's syringe I injected one drop of a fresh emulsion of the orange fungus of osteomyelitis, cultivated on agar, into the anterior chamber of the right eye, letting the animal afterward without bandage take care of itself.

Dec. 19*th.*—*Left*, opacity of the lens without any irritation; *Right*, profuse purulent secretion; cornea white, anterior chamber full of pus.

Dec. 21*st.*—*Left*, no irritation; *Right*, purulent secretion; anterior chamber filled with pus; cornea ulcerous.

Dec. 22*d.*—Eyes in the same condition. The animal is emaciated; its hair shaggy, and it suffers from yellow diarrhœic discharges. Innumerable small cocci are found on microscopic examination of dried and stained cover-glass specimens, taken with a previously heated gelatine wire from the pus in the anterior chamber.

Dec. 23*d.*—Left eye free from irritation; the right cornea partially destroyed; purulent panophthalmitis. The animal looks wretched, and dies in the night.

Dec. 24*th*, AUTOPSY.—The skull was opened with bone scissors. The brain was normal. The optic tracts were severed behind the chiasm. With a small pair of bone-forceps the osseous plates covering the optic nerves were removed and the optic nerves of both eyes carefully laid bare. Neither they nor the chiasm showed any thing abnormal; the internal organs were found healthy with the exception

of the liver which contained numerous small yellowish, dense patches. Gelatine and agar cultures were taken from the interior of the right eye, the chiasm, and the optic nerves close behind the eye. They all developed well. Dry-cover specimens, taken from the same places, and from the blood and the interior of the left eye, were stained with aniline colors, but cocci were found only in the pus which filled the interior of the right eye. They were present in great quantities in the protoplasm of the pus corpuscles, or scattered also in the adjoining free space, or lying in large colonies on a collection of pus cells. They were exactly like the small cocci injected into the anterior chamber. Here and there they were arranged in small chains. Beside these, a sparing quantity of equally or more darkly-stained, larger (about twice the size of the smaller) granules were found single, in small clusters or chains. They have been described as larger cocci, but may be spores of mould. The cultures from the chiasm and the optic nerves had grown but little and were inodorous. Those from the right optic nerve and the chiasm showed under the microscope an innumerable quantity of *short bacilli* with some micrococci interspersed. Surprised at this condition I prepared several specimens from different places of the cultures and examined them carefully: they appeared like short bacilli, not as diplococci. The culture, taken from the left optic nerve near the globe, proved to be pure ordinary cocci, many of them arranged in short chains. A culture taken from the discinded lens of the left eye had developed, and consisted of cocci.

EXPERIMENT VI.—*Discision. Injection of the fungus of osteomyelitis into the anterior chamber. Panophthalmitis.*

Dec. 18*th.*—I made, in a like rabbit, a similar simple discision of the lens in both eyes, and injected into the anterior chamber of the right a drop of an emulsion of osteomyelitis fungus from a test-tube culture which I had taken from the anterior chamber of a rabbit previously inoculated with the same fungus.

Dec. 19*th.*—L, no irritation; lens opaque. R, purulent secretion. Anterior chamber half filled with pus.

Dec. 20th.—L, no irritation. R, intense suppuration; Cornea sloughing; anterior chamber filled with pus.

Dec. 22d.—Pus from the anterior chamber contains groups of ordinary cocci in the protoplasm of the cells.

Dec. 26th.—R, still copious discharge; cornea totally destroyed; iris lying bare. L, lens less opaque; no irritation.

Dec. 29th.—R eye one mass of pus.

Dec. 31st.—R, cornea and iris having disappeared, a white granular substance protrudes from the depth. The lean but lively animal, the left pupil of which is almost completely clear, is put to death by chloroform.

AUTOPSY.—Opening of the skull as in the preceding case. Brain and inner organs normal, excepting the liver, which contained a number of gray dense patches free from cocci. The right eyeball is small, its sclerotic white, whereas that of the other eye is blackish. The right optic nerve is slighty yellowish, otherwise not different from the (normal) left. Chiasm normal. The left eye, apart from the discision scar, is perfectly healthy. I desire to state particularly that nothing abnormal can be detected in the fundus oculi either with the naked eye or with a magnifier.

Dry-cover specimens and cultures were taken from the interior of the right eye, both optic nerves, the medulla oblongata, the heart-blood, the juice of the kidneys, and the disseminated patches in the liver. The inflammatory changes in the kidneys, which F. Krause describes in his experiments, were absent. The right optic disc and adjacent parts were swollen; the specimens taken from these parts contained numerous groups of small, apparently shrunken cocci, regularly developed only here and there. The specimens from the optic nerves and chiasm contained no unmistakable cocci.

In six days, at the temperature of a heated room, only three of the cultures developed—namely, those from the vitreous, optic nerve and optic tract of the right eye. The first two were pure cocci, but that from the right optic tract, and perhaps the adjacent brain substance, into which the inoculating-needle may have dipped, showed short bacilli exclusively. One colony only of this culture, about the

size of a millet seed, in the middle of the needle-track, had developed, whereas a goodly number of dots lined the track from the optic-nerve culture, and the culture from the vitreous had grown luxuriantly.

EXPERIMENT VII.—*Section through cornea, iris, and lens. Painting of the wound with staphylococcus pyogenes albus. Panophthalmitis.*

On *Sept. 24th*, in the bacteriological laboratory of Berlin, I made with a Graefe knife a section, about 9 *mm.* long, through the upper part of the cornea, iris, and lens of both eyes of a full-grown rabbit. The iris prolapsed. A small quantity of a pure culture of the white pyogenic staphylococcus, taken directly from the test-tube with a sterilized platina wire loop, was spread over the wound of the *right* eye.

Dec. 25th.—No secretion, no irritation in the *left* eye. The protruding iris, plugging the wound completely, is covered by a trace of mucus. The upper part of the cornea is diffusely gray, clearing toward the centre. The anterior chamber is reëstablished. The lower half of the cornea, the aqueous humor, iris, and pupil are clear. To finish the description of this eye without interruption I will state that the prolapse of iris diminished from day to day, and finally disappeared without the formation of a staphyloma; the cornea was clear except at the site of the wound, and the centre of the lens remained transparent.

In the *right* eye profuse purulent secretion had developed. The conjunctiva was red and moderately swollen. The cornea was white in the vicinity of the wound, the iris discolored and swollen.

Dec. 26th.—R eye swollen; copious purulent discharge; the wound closed; the upper part of the cornea white; the anterior chamber filled with pus; in short, *the picture of suppurative panophthalmitis in its typical aspect after extraction of cataract.*

Dec. 27th.—Anterior chamber filled with pus; cornea white, infiltrated all around.

Paracentesis liberated flaky pus, in which I detected no cocci with the microscope, but four needle and three plate cultures taken from it developed pure staphylococcus albus and aureus mixed. They had macroscopically and microscopically the same appearance as the original culture, and

on inoculation manifested the same degree of virulence. Two days later I enucleated the eye and placed it in alcohol. When hardened it was examined with the microscope. Microtome sections discovered cocci in the substance of the cornea but not in the protruding iris. The whole interior was filled with a chalky-white, somewhat granular mass, in which cocci were not detected with certainty.

EXPERIMENT VIII.—*Wound contaminated with virulent pus. No suppuration.*

Nov. 25th.—A section extending to the ciliary region was made through the upper part of both corneæ of a guinea-pig, and pus from the conjunctival sac of the rabbit described in the preceding case was stroked over the wound in the right eye by means of a platina wire loop.

Nov. 26th.—Both corneæ around the wound diffused and opaque, the right somewhat more than the left. No secretion.

Both wounds closed; the corneæ cleared up; the left was quite clear in nine, the right in fourteen, days.

EXPERIMENT IX.—*Pyogenic fungi put into the conjunctival sac, then incision made through cornea and iris. No suppuration.*

Nov. 26th.—I put, by means of a wire loop, several drops of a liquefying, very luxuriant culture of staphylococcus pyogenes albus and aureus mixed, from a plate, into the right conjunctival sac of a rabbit. Ten minutes later I thrust a cataract-knife through the cornea, iris, and lens of this eye, after having just before made the same operation on the left, not infected, eye.

Nov. 27th.—The wound of the right eye healed so as to leave scarcely a trace of the injury. In the left a prolapse of iris, clean, disappearing gradually without irritation in two weeks; cornea and pupil clear.

EXPERIMENT X.—*Corneal section with infected knife. Panophthalmitis.*

Nov. 26th.—On the left side, section with a Graefe knife through cornea, iris, and lens; on the right, the same operation after the knife had previously been dipped into the liquefied gelatine on a plate of a pure culture of staph. pyog. aur.

Nov. 27th.—L, prolapse of iris; no secretion; no irritation

During the following ten days the wound healed in the ordinary way, without irritation, leaving a partial staphyloma. On the *right* side the lids were swollen, closed by dried, purulent secretion, which, on forcible opening of the lids, ran out copiously. Chemosis. Upper segment of cornea white, infiltrated with pus. Pus in the anterior chamber.

Nov. 30*th.*—R, suppuration increased.

Dry-cover specimens of the secretion discovered no microorganisms with certainty, but needle cultures taken from the secretion developed vigorously as staphylococcus pyogenes aureus.

Dec. 5*th.*—The inflammatory symptoms gradually subsided, the wound contracted.

On *Dec.* 10*th* only the upper part of the cornea was yellow, but covered with epithelium.

I made an incision into the yellow, infiltrated portion of the cornea, and used the tissue juice for dry-cover specimens and test-tube cultures. The former discovered no microbes and the latter did not develop, the microbes evidently having all been dead.

Jan. 21, 1886.—The yellow infiltration disappeared completely and the inflammation disappeared, leaving a slightly prominent corneal staphyloma.

EXPERIMENT XI.—*Corneal section, contaminated with staphyloc. pyog. aur. Panophthalmitis.*

Dec. 4*th*—Puncture of the right cornea of a rabbit with a broad needle, enlarged with scissors. Particles of a pure culture of staph. pyog. aur. on agar were put with a wire into the anterior chamber, near the wound, and the wire was passed once over the iris protruding in the wound. L, the same operation with the same instruments, previously brought to a glow in a gas flame. No inoculation.

L, prolapse of iris, but no inflammation. The recovery took place in the usual way.

R, profuse suppuration. Cornea white.

Dec. 9*th.*—The whole right cornea white. Suppuration copious.

Dec. 12*th.*—Upper and central parts of cornea white, lower gray. Termination, total opacity of cornea.

On the second day, cultures were taken from the pus in the anterior chamber. They developed on agar as staphyloc. pyog. aur. pure, in gelatine as st. pyog. aur., and alb. mixed. Cultures from the juice of the inspissated infiltration of the cornea did not develop.

EXPERIMENT XII.—*Section through cornea and iris, contaminated with staphyloc. pyog. alb. Panophthalmitis.*

With a pure culture, derived from the pus in the anterior chamber of the rabbit used in experiment VII., the right eye of a rabbit was infected by means of a wire loop moistened with the culture (albus) and passed over a simple incision through the cornea and iris. In the left eye the same procedure with a wire loop previously heated to a glow. This eye recovered in the usual way without irritation. The other presented next day the well-marked picture of primary suppuration, developing into panophthalmitis.

On the second day, cultures were taken from the pus of the wound. They developed as a mixture of staphyl. pyog. albus, aureus, and citreus. On agar two thirds were aureus, one third albus. In dry-cover specimens the cocci were found abundantly. On the sixth day I killed the animal, found every thing normal, excepting the eyes; in particular, the optic nerves, the chiasm, and the brain were without macroscopic changes.

EXPERIMENTS XIII. AND XIV.—*Extraction. Contamination with bacillus pyogenes fœtidus and staphyloc. pyog. citreus. Panophthalmitis. Vascular parenchymatous keratitis.*

On the 15th of Dec. I made an extraction on both eyes of two rabbits, and contaminated the wound of the right eye of one rabbit with a pure culture of bacillus pyogenes fœtidus, that of the other with staplyloc. pyog. citreus, both discovered by Passet. In order to render the difference between mere traumatism and infection as conspicuous as possible, I made the operations on the left eye in both rabbits most extensive. When the lens was removed, I passed a wire previously brought to a glow, repeatedly over the ciliary processes until a large prolapse of vitreous had occurred and the wound gaped widely. The rabbits left alone drew the nictitating membrane repeatedly over the eye, and in about an hour the prolapse of vitreous had been brushed away. They kept

their eyes open, moving the lids and the nictitating membrane from time to time.

These two, quite coarse operations, were recovered from without a trace of suppuration, with very slight injection, and without secretion.

The two right eyes, on which the extraction had been performed continuously and without accident, presented profuse suppuration of the wound ; white cornea and gray iris on the following day. Subsequently the eyeball swelled, the anterior chamber was filled with pus and the secretion was profuse. The upper part of the cornea gradually sloughed away, the wound filled with inspissated pus and retracted, while the remainder of the cornea became diffusely opaque and covered from the edge with a dense network of blood-vessels (vascular parenchymatous keratitis, Jan. 2, '86).

The secretion of the wound examined by means of cultivation and dry-cover glass specimens contained many bacteria. The cultures of fœtidus were short bacilli, did not liquefy the gelatine, had a blue tinge on the surface, and a bad odor. The cultures of citreus were cocci, they liquefied the gelatine, and were partially white, partially more or less orange, without reproducing the pure lemon-yellow of the original culture.

EXPERIMENT XV.—*Extraction. Contamination with the micrococcus of osteomyelitis. Suppuration. Phthisis bulbi.*

Dec. 16th.—Simple extraction. Contamination of the wound with a three-weeks-old, yellow culture of an emulsion, the micrococcus of *osteomyelitis*, a drop being spread over the wound with a wire loop. The next day profuse purulent discharge, the upper part of the cornea whitish yellow, the wound gaping, anterior chamber filled with pus. During the next few days suppuration continued ; then it gradually disappeared. The cornea cleared from below upward, the hypopyon disappeared, the vitreous was yellowish white, at the closing wound there was a circumscribed purulent abscess of the cornea which disappeared in two weeks after the operation. Eyeball shrinking (*from internal suppuration with partial destruction of the cornea*).

The verifying eye, in which extraction with prolapse of the vitreous had been made, recovered in the usual way without irritation.

In the secretion of the anterior chamber micrococci were freely demonstrated by dry-cover specimens and cultures. The latter developed white at first, but became yellow afterward, liquefied, cone-like, the jelly in the test-tube producing at the lower end a granular (at first white, then yellow) sediment; while on the surface of agar they developed into neat, coalescing orange clusters, the true picture of *staphyloc. pyog. aureus.* These cultures were used for further inoculations. They showed the same properties and the same pyogenic energy as the original.

EXPERIMENT XVI.—*Extraction with an infected knife. Panophthalmitis.*

Dec. 24th.—*L*, extraction, knife introduced three times, iris in the wound.

R, section with a single introduction of a Graefe knife, previously moistened with an emulsion of osteomyelitis coccus. The culture was orange-colored, and showed under the microscope small cocci—single, double, and in short chains.

Dec. 25th.—*L*, wound clean, plugged with iris. Upper part of cornea profusely gray. Neither congestion nor secretion. *R*, purulent secretion, wound gaping, in it a black bead of vitreous. Lower two thirds of cornea filled with pus.

The left eye recovered smoothly. In the right panophthalmitis developed with total destruction of the cornea.

EXPERIMENT XVII.—*Discision with an infected needle. Panophthalmitis.*

Dec. 24th.—*L*, discision of lens with a needle. *R*, the same, the needle having previously been moistened with an emulsion of the fungus of osteomyelitis.

Dec. 25th.—*L*, opacity of lens without irritation, puncture of cornea clean, iris normal. *R*, closed, purulent discharge on separating the lids. Cornea around puncture swollen, infiltrated with pus. Streaky, purulent exudation in the shallow anterior chamber. Eye swollen.

Dec. 25th.—*R*, profuse sanguino-purulent discharge on forcible separation of the swollen lids. Eye swollen, cornea opaque. Pus in the pupillary space and in the lower part of the anterior chamber.

Jan. 2, 1886.—Right eye lost from panophthalmitis; the left has remained free from inflammation.

EXPERIMENT XVIII.—*Extraction. Pressing out of the lens with infected lids. Panophthalmitis.*

Dec. 28th.—*L*, ordinary extraction. *R*, the same; after an emulsion of osteomylitis coccus had been freely applied to the conjunctival sac and over the edge of the upper lid. When the corneal section, which at the same time had opened the capsule, was completed, the lens was pressed out with the edges of the lids, and the remnants of the lens were wiped out of the wound with the edge of the upper lid.

Dec. 29th.—*L*, large prolapse of iris, covered with a streak of mucus which, when drawn away with a pair of forceps, left a smooth, clean surface. Cornea in the neighborhood of the section diffusely opaque. Pupil and iris clear. The eye recovered without irritation. *R*, excessive purulent secretion; thin, turbid liquid escaped even from the nose. The whole cornea white; the wound and protruding iris white, bathed with pus.

Jan. 2, 1886.—Most pronounced panophthalmitis.

The pus taken from the wound the day after the operation, presented under the microscope an immense quantity of cocci.

EXPERIMENT XIX.—*Needle inoculation with the micrococcus of osteomyelitis. Circumscribed abscesses. Recovery.*

Dec. 28th.—Three punctures of the corneal substance, without perforation, were made with a Graefe knife, the point of which had been previously dipped into an emulsion of the coccus of osteomyelitis.

Dec. 29th.—Moderate discharge. The three punctures are white, raised, from two to four millimetres in diameter.

Dec. 30th.—The three points have developed into prominent corneal abscesses. Hypopyon filling the lower third of the anterior chamber.

Dec. 31st.—Abscesses smaller, cornea clearing; no secretion.

Jan. 4, 1886.—Abscesses very small, circumscribed opacities.

Under cocaine a small quantity of the contents of the absorbing abscess was removed with a needle and examined in dry-cover glass specimens, stained with aniline. It showed an immense quantity of small, feebly-stained, somewhat irregular granules (cell detritus and dead cocci).

EXPERIMENT XX.—*Five needle-pricks in the cornea, fungus of osteomyelitis painted over them ; only one develops into a pustule, which gradually disappears.*

Dec. 28th.—With a clean Graefe knife the cornea is pricked in five points and then repeatedly painted with an emulsion of the coccus of osteomyelitis by means of a wire loop.

Dec. 29th.—The whole cornea clouded, but only one prick is white. Slight secretion.

Dec. 30th.—The white, infiltrated point somewhat larger than the day before ; the remainder of the cornea clearer.

Dec. 30th.—The circumscribed infiltration smaller.

Jan. 1, 1886.—Still smaller and covered with epithelium.

Its contents scraped out with a needle and microscopically examined showed the same detritus as in the preceding case.

EXPERIMENT XXI.—*Painting of a healing scar with micrococci of osteomyelitis. No reaction.*

Dec. 28th.—An emulsion of recently cultivated osteomyelitis cocci, which, in other experiments, had proved very efficient, was spread by means of a wire loop repeatedly over the iris, which filled the clean extraction-wound of the left eye of a rabbit operated on twelve days previously (Expt. XV., verifying eye). Absolutely no reaction followed. The next day the eye looked whiter and the scar was cleaner and smoother than before.

EXPERIMENT XXII.—*R, extraction with an infected knife ; L, extraction with the same knife, over which a current of water had been running a quarter of a minute. Panophthalmitis on both sides.*

Dec. 29th.—On the right eye, extraction with a Graefe knife previously dipped into an emulsion of micrococci of osteomyelitis. On the left eye the same operation, with the same knife, over which a stream of ordinary water from a hydrant had just before been running for a quarter of a minute.

Dec. 30th.—Purulent iridokeratitis in both eyes, *L* even more than *R*. Purulent secretion marked.

Jan. 2, 1886.—Infiltration of the flap limited in both eyes, right almost disappeared. Both corneæ and anterior chambers opaque. Irides and pupils not to be seen. The purulent inflammation extends no doubt to the deeper parts.

Jan. 4, 1886.—Panophthalmitis in both eyes with preservation of the cornea.

Examination of the secretion of the wound showed the leucocytes loaded with cocci.

EXPERIMENT XXIII.—*R, extraction with an infected knife. Panophthalmitis. L, extraction with the same knife after it had been washed with water and wiped clean with a towel. Recovery without irritation.*

Dec. 29th.—*R*, extraction with a Graefe knife previously dipped in an emulsion of the coccus of osteomyelitis. *L*, the same operation with the same knife which had just been washed in ordinary hydrant water, washed clean, and polished with a recently washed ordinary towel of the anatomical laboratory.

Dec. 30th.—*R*, suppuration in the wound marked as usual; *L*, no secretion, no irritation. Iris in the wound clean. Upper part of cornea cloudy, the lower two thirds, the pupil and iris clear.

Jan. 2d.—*R*, panophthalmitis; *L*, no irritation.

Jan. 4th.—*L*, smooth recovery.

EXPERIMENT XXIV.—*Emulsion of pyogenic cocci put into the conjunctival sac. Extraction and paracentesis with a clean knife. Suppuration in both cases.*

Dec. 29th.—An emulsion of a fresh culture of the fungus of osteomyelitis is dropped repeatedly into the upper and lower parts of the conjunctival sac and painted over the cornea. Two minutes later the lens is extracted from the left eye with a sterilized Graefe knife, and with the previously heated blade of the same a paracentesis of the anterior chamber and a puncture into the substance of the cornea of the right eye are made. By the next day the left eye presented the usual wound suppuration, and the right well-marked abscesses as the punctures. Purulent secretion in both. The extraction-wound causes panophthalmitis; the corneal abscesses cause hypopyon in the next few days, burst on the outer surface, and disappear, leaving cicatrices.

Jan. 4th.—The contents of the abscess, obtained with a needle, show in the dried and stained cover-glass specimen distinct colonies of irregular, evidently decaying cocci.

EXPERIMENT XXV.—*Squint-operation; infected. Phlegmon. Recovery.*

Dec. 23d.—I made a subconjunctival tenotomy of the upper straight ocular muscle of a rabbit and introduced with a wire loop a very small quantity of a culture of osteomyelitis coccus.

Dec. 24th.—Purulent secretion on the lids and in the conjunctival sac. The regions of the wound swollen, whitish yellow, its neighborhood congested, cornea clear.

Dec. 25th.—No secretion, cornea clear, region of the divided muscle greatly swollen (abscess).

Jan. 2, '86.—The phlegmon discharged a good deal of thick yellow matter. The cornea clear, and the region of the wound less swollen and red.

Jan. 4, '86.—Swelling and suppuration have almost disappeared.

Cultures of the pus taken the day after the operation grew luxuriantly and showed on Jan. 4th pure cocci.

Reviewing these cases in groups we arrive at the following results:

1. **Two cases of discision with injection of a drop of an emulsion of pyogenic cocci into the anterior chamber** (exp. V. and VI.). The operation was immediately followed by the most intense primary suppuration in the anterior chamber with purulent maceration of the cornea and of all interior parts of the eye. Both animals looked ill, the one died on the sixth day, the other recovered and was killed on the thirteenth. Under the microscope and by cultivation cocci were discovered in the pus, the cornea, and inner membranes; besides that, cultures developed from the optic nerves, the chiasm, one optic tract, and the lens of the other eye, though I did not succeed microscopically in demonstrating cocci in these and other parts of the body, nor in the blood. It surprised me to see short bacilli develop in some cultivations that were taken from parts behind the eye, while others reproduced the injected micrococcus of osteomyelitis, which I cannot but consider to be identical with the staphyl. pyog. aureus on account of the indentical morphological, biological, and pathogenic properties they have in common. I desire to mention here the interesting experiments of Deutschmann,[1] who after injection of large

[1] Experimenteller Beitrag zur Pathogenese der sympathischen Augenentzündung, *Graefe's Arch.*, Bd. xxvii., ii., pp. 291–300, 1882. Zweiter Artikel, *Ibidem*,

quantities of pyogenic fungi into the vitreous of one eye could observe their migration with concomitant inflammation through the optic nerve of the infected eye, the chiasm, and the optic nerve of the other eye into the posterior segment of the latter. All his animals died in a few days. I would dwell on these interesting and suggestive investigations as well as on Deutschmann's bacteriological researches of enucleated human eyes if it lay within the scope of my subject. The object of my experiments is not to find the paths by which micro-organisms travel through the organs of the body, but to determine their pyogenic properties with special reference to the operations of the eye. These properties manifest themselves most strongly when the organisms are injected through a small wound into the interior of the eye and are there retained, a fact which is in harmony also with the experiments of Deutschmann.

2. **A discision with an infected needle** (exp. XVII.) was followed by severe primary suppuration in the track of the needle through the cornea and in the anterior chamber, and loss of the eye. It is evident from this observation that, under certain conditions, the quantity of the infecting material may be small, the traumatism insignificant, and yet the suppuration marked and extensive. Cases of suppuration from discision, especially in old secondary cataracts, have occurred several times in my own practice; I have also seen them (even last year) in the practice of others that operate antiseptically, so that an introduction of pyogenic germs could, it seems, be excluded. To enter more deeply into this question would, in this place, lead me too far. I desire only to remark that these cases resembled those in which a foreign body, a scar, a small prolapse of iris, or an iridencleisis not visible exteriorly may have existed without irritation for many years, and then suddenly produce suppuration after very insignificant traumatism, or, indeed, without assignable cause. Recent investigations seem to make it probable that, in some cases, the suppuration after discision is not due

Bd. xxix., iv., 261–270, 1883. Dritter Artikel, *Ibidem*, Bd. xxx., iii., pp. 77 to 122, 1884. Erster Nachtrag, *Ibidem*, Bd. xxx., iii., pp. 331–336, 1884. Zweiter Nachtrag, *Ibidem*, Bd. xxx., iv., pp. 315–317, 1884. Vierter Artikel, *Ibidem*, Bd. xxxi., ii., pp. 270–290, 1885.

to fresh introduction of pyogenous elements with the needle, but to older, latent local deposits of cocci, or to their presence in the humors of the organ or the whole body, so that the traumatism is to be regarded only as one of the conditions by forming a locus minoris resistentiæ. Among these investigations I may mention those of Becker,[1] F. Krause,[2] and Rosenbach,[3] who, after simple fractures in animals, have seen suppuration occur only when osteomyelitis micrococci were injected into the veins. Also the experiments on ulcerous endocarditis recently communicated by Orth,[4] at the Society of Naturalists and Physicians, at Strasburg, may serve to lend weight to this supposition. When he and Dr. Wyssokowitsch pierced the aortic valves from the carotid with a blunt-pointed probe, neither endocarditis nor thrombotic deposits occurred at the injured place; but when pyogenic organisms were injected into the vein of the ear simultaneously, or one or two days later, acute endocarditis with metastatic abscesses developed, of which the animals died in from two to five days. The organisms did not settle at certain places arbitrarily but only where a previous disturbance had caused a predisposition. This tendency may be produced by very insignificant mechanical injuries, for the organisms did not settle on the lacerated valves only but also on the large vessels over which the knob of the probe had slid. By such and similar experiments the old doctrine of "impure humors" gains a visible form. If we call this process constitutional or indirect infection of a wound, the possibility of which, according to what has been said, can scarcely be denied, our experiments positively demonstrate the importance of direct infection even by instruments of the smallness of a division needle.

3. Three cases (XIX., XX., and XXIV.) of **inoculation by pricks of a needle, and paracentesis.** These inoculations caused circumscribed corneal abscesses with so much the

[1] Vorläufige Mittheilung, etc., von Struck, *Deutsche med. Wochenschr.*, 1883, No. 46.

[2] *Fortschritte der Medicin*, 1884, No. 7 u. 8.

[3] Wundinfectionen des Menschen, Wiesbaden, 1885.

[4] *Tageblatt*, page 58, Strasburg, 1885.

more certainty as the micro-organisms were introduced the more directly and probably also the more plentifully and deeply into the corneal substance. The paracentesis with an infected needle caused the largest abscess, the inoculation pricks with an infected needle produced well-developed pustules, whereas, of the five punctures with a clean needle, after which the emulsion of microbes was immediately painted over the cornea, only one developed into a circumscribed purulent exudation which soon disappeared. I may mention in connection with this that I painted an emulsion of pyogenous bacteria over the corneæ of a guinea-pig and some rabbits after I had made superficial scratches in the cornea with a knife, but produced no more than a transient opacity without suppuration.

Inoculations of the cornea have been made by F. Krause and Passet. Krause[1] says: "If the cornea is inoculated by making a small pouch into the corneal substance with a division needle, previously brought to a glow, an infiltration of the cornea occurs, which in most cases disappears in a short time. In two eyes out of twelve hypopyon formed. In the pus of the enucleated eye no micro-organisms were found and the planting of pus from the hypopyon on agar-agar yielded a negative result." I can say the same of a case in which hypopyon formed three weeks after an extraction that had healed with a smooth scar. In the pus, aseptically obtained by paracentesis of the cornea, no micro-organisms could be detected in dry cover specimens and four gelatine plates charged with it showed no trace of growth. These observations harmonize with the investigations of R. Koch, A. Ogston,[2] and others who found cocci in the pus of acute abscesses only.

R. Koch, in his classical monograph, "Investigations on the etiology of diseases by wound infection,"[3] describes the whole process of the formation of abscesses in a very clear manner. The bacteria are met with in large numbers in the abscess wall and the near vicinity whereas the caseous con-

[1] *Fortschritte der Medicin*, 1884, p. 228.

[2] Ueber acute Abscesse, *Archiv f. klin. Chirurgie*, Bd. xxv., Heft 3, p. 588, 1880, und an verschiedenen Orten im *Brit. Med. Journ.*

[3] Leipzig, 1878, p. 51, u. f.

tents are made up of cell detritus and dead, scarcely recognizable cocci.

Passet [1] noticed, after inoculation punctures with staphyloc. pyog. aureus (*l. c.*, p. 21), albus (p. 25), and citreus (p. 27), whitish-gray, circumscribed exudations which disappeared in from four to ten days, leaving a speck.

The necessity of a certain quantity that must not be too small to render inoculations efficient, is not only demonstrated by my experiments but has been noticed and distinctly pointed out by many others. F. Krause [2] says: "No reaction occurs if a small quantity of a pure-culture is put, without attenuation, into a pouch in the skin of a rabbit, guinea-pig, or mouse, with a platinum needle previously heated.

4. **Negative experiments with pyogenic material** (exp. VIII., XXI., and XXIII.). Pus was put into an incision through the cornea and iris of a guinea-pig. It was taken from a rabbit affected with acute corneal suppuration and certainly was not sterile, for at the same time much smaller quantities of it were used for needle cultivations which not only developed vigorously, but wounds inoculated with these cultivations suppurated freely. There remains no other possibility than to assume that the inoculated quantity was insufficient at least for this guinea-pig.

A very strong emulsion of osteomyelitis fungus (expt. XXI.) was painted freely over the cicatrizing wound of a rabbit, without any effect. The wound may have been entirely covered with epithelium and thus protected, but I have recently seen (in the above-mentioned case of hypopyon, where the pus contained no cocci) the apex of a corneal flap become white about twelve days after a cataract-extraction, the cicatrix up to that time having been perfectly free from irritation. The infiltration disappeared in three or four days, but a week later hypopyon made its appearance without any abnormity to be noticed in the cornea or iris. The patient suffered from chronic conjunc-

[1] Untersuchungen über die Ætiologie eitriger Phlegmone des Menschen. Berlin, 1885.

[2] *Fortschritte der Medicin*, 1884, p. 227.

tival catarrh, but had been treated and operated on under strict antiseptic precautions. The other eye, operated on shortly before by a very skilful hand, had been lost through intense iritis and iridocyclitis. If we are loath in this anæmic patient to accuse impure humors, we are forced to assume that pyogenous fungi from the conjunctival sac must have subsequently infected the incompletely closed or partially reopened wound, and migrating through the fresh scar to the ciliary body produced a purulent cyclitis. How much the susceptibility varies in different species of animals, even in different individuals of the same species, has long been known. The most striking example of this fact with reference to bacteriology is the observation made by R. Koch and reported in his "Diseases by Wound Infection," 1878, that the smallest quantity of the bacillus of mouse septicæmia kills the house-mouse, but has no influence on the field-mouse. Expt. XXIII. shows a regular primary suppuration after an infection of the blade of the knife, whereas an extraction made on the other eye with the same blade, after it had been washed and polished with a clean towel, healed without irritation. The instrument after this simple cleansing proved sterile with reference to the inoculation of this rabbit. I do not venture to maintain that this kind of sterilization suffices for all rabbits or all men, but according to recent investigations[1] this seems to be the case for surgical instruments in general and especially for polished ones.

5. **Insufficient cleansing of an instrument.** In connection with the preceding remarks the following observation (expt. XXII.) is of particular importance. The right eye of a rabbit was lost by primary suppuration after extraction of the lens with a Graefe knife that was contaminated with an emulsion of osteomyelitis fungus. The extraction of the lens of the left eye with the same knife, though after the operation on the right a stream of hydrant water had been

[1] *Gärtner* u. *Plagge:* Ueber die desinficirende Wirkung wässeriger Carbolsäurelösungen. Verhandl. der Deutschen Gesellschaft für Chirurgie. Berlin, Hirschwald, 1885, II. p., 1–11.
H. Kümmel: Die Bedeutung der Luft- u. Contactinfection für die practische Chirurgie. *Ibidem*, II., p. 430–446.

running over it, produced a suppuration no less intense. The water of the new Berlin water-works, which at present is remarkably pure, can scarcely have been the cause of the suppuration, and we must assume that the micrococci adhered so firmly to the steel as not to be swept away by a simple stream of water, whereas washing of the blade with the fingers and polishing it with a towel removes them thoroughly enough.

Experiments on that point, with special reference to ophthalmological practice, would be highly desirable. How surely is sterilization effected, 1. by ordinary cleansing? 2. heat, of what degree, and how long? 3. absolute alcohol? 4. carbolic acid? 5, corrosive sublimate? 6. boric acid, etc. How surely do these chemicals sterilize, with or without previous ordinary cleansing of an infected instrument? The examination should be made according to the different methods of cultivation, inoculation, and operations, of course with strict observance of the rules of bacteriology. The above-mentioned experiments of Gaertner, Plagge, and Kümmel might be used for comparison.

6. **Incisions through cornea, iris, and adjacent part of the lens.** Inoculation with different pyogenic bacteria. Four cases (exp. VII., X., XI., and XII.), all lost by primary suppuration.

7. **Four cases of extraction, the wound infected with different pyogenic bacteria** (exp. XIII., XIV., XV., and XVI.). Suppuration in all. The verifying operations in these two groups, though performed in the most extensive and unsparing manner, were followed by prolapse of iris, transient diffuse gray opacity of the flap, but no suppuration.

8. **Subconjunctival squint-operation** (exp. XXV.). This operation also, after inoculation with the pyogenous fungus, was followed by primary suppuration. Fourteen years ago I made a subconjunctival tenotomy in a boy who, after the operation, on a cold winter day, travelled three hours in a carriage, vomiting frequently (he had been anæsthetized with chloroform) and held his head out of the carriage. On the third day I was called, and found a phlegmonous inflammation like the one in our rabbit, which was recov-

ered from, but left a divergent strabismus. At the time I attributed this to the influence of the long drive in the cold. Last summer I saw a subconjunctival tenotomy followed by a small pustule at the upper end of the wound canal, under the unbroken conjunctiva. It burst and disappeared without inconvenience in a few days. In drawing the attention of the assistants and students to this case, I remarked that scarcely any other explanation could be given than infection by the introduction of germs with the instruments. I do not recall other cases of suppuration after tenotomy (I have made about 3,000), and certainly no loss has occurred. Be the number ever so small, our experiment and the just-mentioned cases demonstrate that primary suppuration from infection may occur even after a simple conjunctival squint-operation.

9. **Operations after infection of the conjunctival sac** (exp. IX. and XVIII.). In addition to the above-cited cases of extraction and paracentesis (exp. XXIV.), and the case reported on sub. 3, two others are still to be mentioned. In exp. IX. small quantities of a staphyloc. growth were put into different parts of the conjunctival sac by means of a wire loop. A section through cornea and iris made several minutes later healed without any reaction by immediate union. In the second case I put an emulsion of staphyloc. freely into the conjunctival sac, spreading it especially over the free edge of the upper lid. After the section and the simultaneous opening of the capsule, I pressed the lens ont with the lids, and wiped the remnants out of the wound with the edge of the upper lid. The operation had been cautiously done, the removal of the lens was complete, the wound closed admirably, but there was intense suppuration the next day.

Among all the faulty manipulations of which in the course of years, in explanation of the failures in my cataract-operations, I have accused myself, I consider, from a bacteriological point of view, none so prejudicial as this apparently so gentle and innocent manœuvre of rubbing the remnants of the lens out of the wound with the upper lid. It is certainly very rare that many pyogenic micro-organisms lodge on a healthy eye and its appendages, but if any

are present they are in all probability located on the edges of the lids more than anywhere else, and carried in the most direct manner into the wound by this mode of wiping away the remnants of cataract. If we hesitate to give up these external manipulations on account of their efficiency in removing remnants, we should take care not to let the edge of the upper lid come in contact wlth the open wound, how carefully soever it may have been bathed inside and out with corrosive sublimate.

To finish I may be allowed to make some

CONCLUDING REMARKS.

It has been on my part, as on that of many others, a great mental struggle to abandon the mechanical theory of suppuration. From the beginning I have appreciated the advantages of antiseptics in surgery so highly that in 1871 I went to Edinburgh for the special purpose of acquainting myself with Lister's method by personal observation. When I asked the great surgeon whether much benefit might be derived from this method in ophthalmic surgery he answered that he did not think so. The operations on the eyeball are mostly small; the territory is so well protected that after the closure of the lids the conditions resemble pretty closely those of a pure subcutaneous operation; furthermore, the conjunctival sac is constantly bathed in an antiseptic fluid, the tears; there is little occasion to contaminate the wound with hands, dressing materials, or instruments difficult to keep clean; the operations are soon over, and, therefore, exposed to injurious influences for a short time only;—all this explains why the results obtained by careful operations without the use of antiseptic agents have not been inferior to the results of those that have imitated the antiseptic methods of general surgery. In ophthalmology, as in general surgery, operations and dressings may be antiseptic without the employment of chemical means, antiseptics—witness the unsurpassed results of Lawson Tait. Moreover, it is to be borne in mind that a new idea thrown into the world commonly causes more harm by having its proper limits of application

transgressed than would come from disregarding it, a fact which is illustrated by the first period of antiseptics in ophthalmology. In the course of years, however, the antiseptic method has not only brilliantly maintained its principle, but divested itself of much that was burdensome and immaterial, and it has conquered more and more ground. Its triumphs have been an incentive to thorough scientific researches in the domain of bacteriology. Although it was a number of years ago that some surgeons made the startling statement: "No suppuration without micro-organisms," and in spite of the recent investigations of Orthmann,[1] J. A. Ruys,[2] Scheuerlen,[3] Klempener,[4] and others, do we not yet find many pathologists who are prepared to accept this statement without reserve? It is sure, however, that the other causes claimed for suppuration are steadily losing ground, and even conservatively disposed natures that have followed the discussion of this highly important scientific question must ask themselves: Will not the pyogenic fungi control their domain as uncontestedly in future as the fermentation fungi control theirs now? Certainly nobody has ever doubted that micro-organisms may produce suppuration, but the microbes were believed to be one of many irritants that have this effect. The above experiments, made according to the methods used in the bacteriological laboratories of Berlin, have had for their object to ascertain by plain demonstration how far mere traumatism carried to its utmost limits can be made responsible for the formation of pus in the limited field of eye operations, and how far the pyogenic species of bacteria that have been purely cultivated during the last few years are concerned in suppuration. The experiments without exception have sustained the bacteriological influence on the formation of pus. I have reported them as they have appeared, leaving it to the reader to draw practical conclusions from them. Yet I should not omit to point out that this field of experimenta tion, already so happily cultivated by Eberth, Leber,

[1] Virchow's *Arch.*

[2] *Deutsche med. Wochenschr.*, No. 48, Nov. 26, 1885.

[3] *Arch. f. klin. Med.*, Bd. xxxii., p. 500.

[4] *Zeitschr. f. klin. Med.*, Bd. x., 1 u. 2.

Deutschmann, and others, is likely to yield the most important results, particularly now that the methods of investigation have gained accuracy and system chiefly through the genius of R. Koch.[1]

[1] To those that wish to make themselves acquainted with the present standpoint of practical bacteriology the following works may be recommended: Hüppe, "Methoden der Bacterienforschung." 3 Aufl. Wiesbaden, 1886. Hüppe, "Formen der Bacterien." Wiesbaden, 1886. De Bory, "Vorlesungen über Bacterien." Leipzig, 1885. J. S. Woodhead and W. H. Hare, "Practical Mycology." Edinburgh, 1885. Cornil-Babes, "Les Bactéries." Paris, 1885.

THE BLIND OF THE CITY OF BRESLAU IN THE YEAR 1884.

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Translated by Isidor Furst, New York.

(*With Plates x.–xvi.*)

1.—INTRODUCTORY REMARKS REGARDING THE NATURE OF THE MATERIAL.

THE statistics of blindness in the present investigation were compiled from the census of 1880 and the special census, made at my request by the Police Department of Breslau, of the blind residing in this city.

I found considerable difficulty in tracing the addresses given in the last official census of 1880, since numerous changes had taken place in the last four years. But with the aid of the Police Department an accurate revision was made, and thereby determined how many of the blind then enumerated were still domiciled in Breslau, how many had died, and how many had removed. In this way a portion of the changes which had transpired since the last census was taken were fully verified. Consequently I believe I am entitled to assert that the investigation I have made is a faithful presentation of the Breslau statistics of blindness, and that the deductions drawn therefrom apply to the ophthalmo-sanitary conditions of this city.

2.—THE PROPORTION OF BLINDNESS IN BRESLAU.

According to the official records, the number of blind persons in Breslau was 290 at the time of the census taken December 1, 1880; of this number 90 were inmates of the

Silesian Institute for the Blind situated in Breslau. Among the blind of a city, district, or other locality with well-defined geographical boundaries, should be counted undoubtedly only those who are permanently domiciled at the locality in question; all those, however, who are merely temporary sojourners at institutions located there must be excluded from the statistics. If this principle were not adhered to, the number of bodily infirmities in the large cities would reach a disproportionate height; for the large cities in particular shelter in their institutions for the blind, deaf-mutes, etc., a number of infirm persons who flock to them from the provinces, and for whose condition their sanitary relations can in no wise be made responsible.

If, in our numerical determination of the blind among the inhabitants of Breslau, we deduct at least the 90 inmates present on December 1, 1880, in the educational institute, we obtain the round number of 200 by official count. But this figure is too high, as shown by my investigation. In 34 persons, officially designated as blind, I was unable to prove blindness either in the scientific or in the popular or political sense.[1] Although they were all suffering from visual disturbances, these could either be remedied by operation, or they were not of such a degree as to justify the term blindness. Twelve of them were affected with senile, uncomplicated cataract, and for them the possibility of a restoration of sight by operation could be pretty positively assumed. At all events, four of these persons have since then regained their sight in at least one eye. Eight of these 34 pseudo-blind persons were very myopic; two had reduced vision from trauma, but could still ply their vocation and read medium-size print; five had maculæ corneæ, with impaired but not destroyed vision; three had disease of the eye at the time of the census, but had since recovered; one had impaired vision from recurrent iritis, but by no means could he be called blind; one hypermetropic person, with V $\frac{20}{40}$, was enumerated as amaurotic. Finally, in the case of two of these persons I was able to convince myself positively

[1] Blindness in the scientific sense I call the incurable total loss of sight; blindness in the popular or political sense, the absolute optic incapacity for the plying of any vocation.

that there was no blindness, although I could not trace the reasons which led to this erroneous statement.

Altogether, therefore, on December 1, 1880, 34 persons had been enumerated as blind in Breslau, though they were not; the official number of blind residents at that time being 200, we must, therefore, deduct 17 per cent. from this number. This result places the reliability of official statistics of blindness in a rather unfavorable light.

According to my revision of the official figures, there must have been 166 blind persons resident in Breslau at the last census. Since the number of inhabitants of our city at that time was 272,912, we would have 6.08 of blind to every 10,000 inhabitants. But as the Royal Prussian Statistical Bureau gives the number of blind in Silesia as 8.4 to every 10,000 inhabitants according to the same census, the quota of Breslau, as compared with the province of which it is the centre, is considerably smaller—a proportion which seems to prevail similarly in Berlin, as compared with the province of Brandenburg.

The relative proportion of the blind to the inhabitants of Breslau at the present time is about the same as in the year 1880. According to my investigation, there are at present 200 blind residents in Breslau—the cases of all of whom have been examined and verified by me. On July 1, 1884, our city had 292,173 inhabitants, and, accordingly, we would have 6.84 blind to every 10,000. Comparing this figure with that of 1880, there would be demonstrable an increase, though slight, in the number of blind during the last three years, since 0.76 more per 10,000 is the present proportion. I do not believe, however, that this result is borne out by an actual increase in the number of our blind, but rather that the result of 1880 was influenced by some sources of error which I was unable to trace in the subsequent examination of the census-sheets. For, just as the official count included among the blind some who could see, so it is likely that some of the blind were overlooked and not incorporated into the figures. This error in the official count seems to have been pretty great; at least v. Zehender[1] has demon-

[1] v. Zehender: "Die Blinden in den Grossherzogthümern Mecklenburg, Eine statistische Skizze." Rostock, 1871.

strated that in 1869 fully 16 per cent. of the blind had been omitted in the official lists, because they had been overlooked.

At all events, the comparison of the quota of 1880 with that of 1884 shows that there has been no considerable increase or decrease in the blind of our city, but that the figures in the last four years have remained nearly stationary.

The 200 blind at present resident in our city are divided, according to sex, into 102 males and 98 females. This proportion, as compared with the present state of our population, shows that of 10,000 male inhabitants, 8.09, and of 10,000 female inhabitants, 6.80 are blind.

3.—THE CAUSES OF BLINDNESS.

In considering the causes of blindness in Breslau, we shall do well to do so from two points of view—a general one, and one applicable only to the ophthalmo-sanitary conditions of Breslau. The general standpoint must seek to determine the amaurotic importance, if I may be permitted to employ that term, of the various diseases of the eye, as well as of the body in general. The special point, however, will have for its object the discovery of the connecting link between the causes of blindness and the ophthalmo-sanitary conditions of our city.

a.—General Consideration of the Causes of Blindness.

Table I. shows the percentage of the various causes of blindness. In order to furnish a better and more instructive insight into the pathological importance of the several types, I have made use of the graphic method in addition. In Plate X. will be found the graphic representation of the causes of blindness found by me in the 280 blind persons.

Table I. enumerates 280 cases of blindness, of which 80 belong exclusively to the institute for the blind—that is to say, affect only young persons. But this large number of young blind people among relatively so small a number as 280 resident in Breslau must exert a considerable influence on the numerical value of the various forms of blindness. Some forms of early blindness, as for instance blennorrhœa

TABLE I.

Causes of Blindness in the 280 Blind Persons Present in Breslau, Including the Permanent as well as the Temporary Residents. (151 *Males*, 129 *Females.*)

	I. Total numbers.	II. Males.	III. Females.
Congenital	22= 7.85 %	10= 6.62 %	12= 9.30 %
Microphthalmus	4= 1.42	. . .	4= 3.13
Anophthalmus	2= 0.71	1= 0.66	1= 0.77
Atrophia nervi optici congenita	4= 1.42	3= 1.98	1= 0.77
Choroiditis	2= 0.71	1= 0.66	1= 0.77
Retinal atrophy	2= 0.71	2= 1.33	. . .
Retinitis pigmentosa	4= 1.42	1= 0.66	3= 2.48
Buphthalmus	1= 0.35	. . .	1= 0.77
Cataracta congenita complicata	3= 1.07	2= 1.33	1= 0.77
Idiopathic Diseases of the Eyes.	136=48.59 %	68= 45.03%	68= 52.71%
Blennorrhœa neonatorum	49=17.50	24= 15.89	25= 19.38
Trachoma	2= 0.71	2= 1.33	. . .
Atrophia nervi optici genuina	19= 6.78	13= 8.66	6= 4.67
Glaucoma	82=10.00	11= 7.28	17= 13.21
Retinitis pigmentosa acquisita	2= 0.71	1= 0.66	1= 0.77
Iritis	4= 1.42	2= 1.33	2= 1.55
Irido-choroiditis	5= 1.78	2= 1.33	3= 2.32
Choroiditis	4= 1.42	1= 0.66	3= 2.32
Choroiditis myopica	4= 1.42	1= 0.66	3= 2.32
Sublatio retinæ	19= 6.78	11= 7.28	8= 6.20
Injuries	24= 8.57 %	18= 11.92%	6= 4.67%
Injuries of the eyes or of the head.	7= 2.50"	6= 3.97	1= 0.77
Operations	8= 2.85"	4= 2.64	4= 3.13
Ophthalmia sympathica	9= 3.21"	8= 5.23	1= 0.77
General Diseases	74=26.42 %	45= 29.85%	29= 22.48%
Syphilis	4= 1.42	2= 1.33	2= 1.55
Scrofula	7= 2.50	4= 2.64	3= 2.32
Cerebrum and meninges	17= 6.07	12= 7.94	5= 3.92
Spinal cord (Tabes)	14= 5.00	9= 5.95	5= 3.92
Morbilli	12= 4.28	7= 4.63	5= 3.92
Scarlatina	4= 1.42	3= 1.98	1= 0.77
Variola	9= 3.21	5= 3.31	4= 3.13
Exanthema—nature unknown	2= 0.71	1= 0.66	1= 0.77
Typhoid fever	3= 1.07	2= 1.33	1= 0.77
Hemorrhages	1= 0.35	. . 0 .	1= 0.77
Pregnancy	1= 0.35	. . 0 .	1= 0.77
Unknown Causes	24= 8.57%	10= 6.62%	14= 10.85%
Totals	280	151 males	129 females

neonatorum, will be represented by a higher percentage in statistics including a disproportionate number of young blind persons than they would in statistics comprising a

smaller number of such. On the other hand, the forms of blindness peculiar to advanced age, such as glaucoma, true atrophy of the optic nerve, tabetic atrophy of the optic nerve, etc., will be represented by a smaller number in a table including many cases of early blindness than they would in one, the individuals in which do not mainly belong to childhood.

Granting the justice of these considerations, I have endeavored in Table II. to present the causes of blindness in a manner calculated to avoid as much as possible the influence exerted by the predominance of a certain class. I thought that this object would be attained most readily by omitting in Table II. the 80 pupils of the institute, and classifying only the 200 blind permanent residents of Breslau according to the causes of their infirmity. I believed myself all the more justified in this step as Table II. gives at the same time an accurate statement of the relative conditions of blindness prevailing in Breslau, with regard to its permanent inhabitants. It is obvious that we can obtain such a statement only when we consider alone the inhabitants really resident in Breslau, and exclude all transient persons. This transient portion of the blind of our city, however, is formed by the pupils of the Silesian Institute for the Blind, and these, therefore, had certainly to be excluded if we intended to obtain a clear insight into the forms of blindness prevalent among the inhabitants of Breslau. Table II. affords us this insight.

Let us now enter on a special consideration of the several forms of blindness. As is shown by Tables I. and II., I have grouped the causes of blindness under four heads, viz.:

Congenital blindness.

Blindness due to idiopathic diseases of the eyes.

Traumatic blindness.

Blindness due to general diseases.

This is the same division I have made at a former time,[1] and which has also been recommended for general introduction by Dr. Roth,[2] at the York meeting of the Society for

[1] Magnus, "Die Blindheit, ihre Entstehung und ihre Verhütung." Breslau, 1883.

[2] Roth, "The Prevention of Blindness." A reprint of a paper read on the 25th July, 1883, at the conference in York. York, 1883.

TABLE II.

Causes of Blindness of the 200 Blind Residents of Breslau.
(102 *Males*, 98 *Females*.)

	I. Total numbers.	II. Males.	III. Females.
Congenital	12= 6.00 %	7= 6.86 %	5= 5.01 %
Atrophia nervi optici congenita	4= 2.0	3= 2.94	1= 1.02
Choroiditis	1= 0.5	1= 0.98	. . .
Retinal atrophy	2= 1.0	2= 1.96	. . .
Retinitis pigmentosa	4= 2.0	1= 0.98	3= 3.06
Buphthalmus	1= 0.5	. . . .	1= 1.02
Idiopathic Diseases of the Eyes.	114=57.00 %	56=54.90 %	58=59.18 %
Blennorrhœa neonatorum	29=14.5	12=11.76	17=17.30
Trachoma	2= 1.0	2= 1.96	. . .
Atrophia nervi optici genuina	19= 9.5	13=12.74	6= 6.12
Glaucoma	28=14.0	11=10.78	17=17.34
Retinitis pigmentosa acquisita	2= 1.0	1= 0.98	1= 1.02
Iritis	4= 2.0	2= 1.96	2= 2.04
Irido-choroiditis	5= 2.5	2= 1.96	3= 3.06
Choroiditis	4= 2.0	1= 0.98	3= 3.06
Choroiditis myopica	3= 1.5	1= 0.98	2= 2.04
Sublatio retinæ	18= 9.0	11=10.78	7= 7.15
Injuries	14= 7.0 %	10= 9.80 %	4= 4.08 %
Injuries of the eyes	4= 2.0	4= 3.92	. . .
Operations	7= 3.5	3= 2.94	4= 4.08 "
Ophthalmia sympathica	3= 1.5	3= 2.94	. . .
General Diseases	42=21.00 %	24=23.52 %	18=18.36 %
Syphilis	4= 2.0	2= 1.96	2= 2.04
Scrofula	2= 1.0	1= 0.98	1= 1.02
Cerebrum and meninges	6= 3.0	5= 4.90	1= 1.02
Spinal cord (Tabes)	14= 7.0	9= 8.82	5= 5.10
Morbilli	6= 3.0	4= 3.92	2= 2.04
Scarlatina	1= 0.5	. . . .	1= 1.02
Variola	2= 1.0	. . . .	1= 2.04
Exanthema—nature unknown	2= 1.0	1= 0.98	1= 1.02
Typhoid fever	3= 1.5	2= 1.96	1= 1.02
Hemorrhages	1= 0.5	. . . .	1= 1.02
Pregnancy	1= 0.5	. . . .	1= 1.02
Unknown Causes	18= 9.0 %	5= 4.90 %	13=13.26 %
Totals	200	102 males.	98 females.

the Prevention of Blindness, on July 25, 1883. Comparison of the relative percentages exhibited by these four main

groups of our Table II. with those found by other authors will show them to be very similar, as will be seen from the following table:

	Bäuerlein.[1]	General table.[2] Collated from the observations of nine authors.	Breslau statistics.
1. Congenital blindness	7.06 %	3.83 %	6.00 %
2. Blindness due to idiopathic diseases of the eyes	62.44	67.08	57.00
3. Traumatic blindness	11.95	10.75	7.00
4. Blindness due to general diseases.	18.47	18.31	21.00

This table shows that groups two and four—blindness due to idiopathic diseases, and that due to general diseases—are the most prolific sources of blindness, and that group two in particular furnishes the majority of cases. Group three—traumatic blindness—occupies the third place in the series, and, finally, congenital blindness, the lowest place. However, this relation prevails only so long as the statistics comprise all ages, none of which predominates largely. But in the latter event, if any age markedly outnumbers the rest, we find at once a notable shifting in the mutual relation of the several groups. Reference to Table IV. of this paper, which comprises only the pupils of the Silesian Institute for the Blind, will show that the most prolific source of blindness there is group four—blindness due to general diseases; blindness due to idiopathic diseases of the eye occupies only the second place in that table. This observation of mine is in perfect accord with the publications of other investigators. I have calculated the relative percentages according to our groups in the reports by Bergmeister[3] and Dantone,[4] and obtained results which tally with my own. This is shown in the following table:

[1] Bäuerlein, "Augenklinik in Würzburg. Bericht über deren 15jährige Wirksamkeit (1869–1883) nebst einer Abhandlung über 400 Staar-Operationen." Würzburg, 1884.

[2] Magnus, "Die Blindheit, ihre Entstehung und ihre Verhütung." Breslau, 1883. Compare the title-page and Table II., p. 106.

[3] "Entlicher, Zweiter Bericht über die niederösterreichische Landes-Blindenschule zu Purckersdorf." Vienna, 1884, p. 63, Table II.

[4] "Istituto per la educazione dei ciechi in Roma." Resoconto dell' anno 1876. Rome, 1876.

	Bergmeister.	Dantone.	Magnus.
1. Congenital blindness	21.53 %	8.33 %	11.49 %
2. Blindness due to idiopathic diseases of the eyes	21.53	36.11	26.92
3. Traumatic blindness	3.07	13.88	15.38
4. Blindness due to general diseases.	53.69	41.66	37.14

This table shows that in the case of the blindness of youth, which is almost exclusively represented in the institutions, general diseases furnish the most prolific source. It is mainly the various forms of the acute exanthemata, next the diseases of the brain and meninges, then scrofula, which endanger the eyesight during the first years of life.

GROUP I.—*Congenital blindness* I was able to demonstrate twelve times among the two hundred blind in our city. In these twelve cases hereditary tendency seems to have been present only once in a case of congenital amaurosis: a girl, born blind with retinitis pigmentosa, had an elder brother who had likewise been blind from birth. The family in question included altogether three children, of whom the older two, a boy and our patient, had been born blind, while the youngest boy had normal vision. In this case there was no consanguinity of the parents, nor could it be demonstrated as an etiological factor of amaurosis in any of the other cases of congenital blindness in our city.

As regards the several forms of congenital blindness, atrophy of the optic nerve was found four times, as appears from Table II. In one of these cases, the atrophy was associated with zonular cataract and epilepsy. This person, a man aged 20, was born prematurely—according to the mother's statement, when the seventh month of pregnancy had barely begun; the epilepsy had set in in the eighth year of life. In another case, that of a boy aged one year, the atrophy of the optic nerve was associated with hydrocephalus.

Retinal atrophy was observed in two cases, one of which was associated with congenital cataract. In this case, the operation had served only the purpose of permitting the

anatomical diagnosis of blindness. In both cases, great hemeralopia had existed from earliest infancy and had soon changed to amaurosis, so that school attendance had been impossible. Ophthalmoscopic examination showed a decolorized optic papilla, thinned retinal arteries, and some few pigment spots in the retina.

Congenital choroiditis was observed but once. One of the eyes showed a cataractous lens, while the other exhibited liquefaction of the vitreous, iridodonesis, white patches irregularly scattered over the fundus, and a rudimentary optic nerve.

GROUP 2.—*Blindness due to idiopathic diseases of the eyes* was demonstrated in 114 cases, according to Table II. In 7 of the cases due to blennorrhœa, iridectomy had been attempted, but ineffectually.

To *true atrophy of the optic nerve* are due 9.5 per cent. of the cases of blindness in group 2. In this form of blindness, a very considerable difference can be noticed in its distribution among the two sexes, for while the male sex numbers 12.74 per cent. of the atrophic blind, the female sex shows but 6.12 per cent. This remarkable prevalence of the male sex is not to be regarded as merely a local, more or less accidental peculiarity of our city; but, according to Leber's[1] investigations, men seem indeed to possess a far greater tendency to blindness from atrophy. This statement has been proved to be absolutely correct by my former investigations regarding the province of Silesia; for according to these, there became blind in consequence of atrophy of the optic nerve (all forms of atrophy together) of 10,000 women 1.521, and of men, 2.281.[2] Of the six females blind from true atrophy of the optic nerve, five were unmarried. In how far the vocation of men favors the origin of blindness from atrophy we shall discuss in one of the succeeding paragraphs; in this connection I shall only state that in one case, that of a superior military officer, the source of the affection was traced with absolute certainty to the fatigue incident to the late French war. We shall meet with a

[1] Leber, "Die Krankheiten der Netzhaut und des Sehnerven." Handbuch der gesammten Augenheilk., Bd. V., Theil 5. Leipzig, 1877.
[2] *Loc. cit.*, p. 252, Table 26.

similar statement in the consideration of atrophia optica tabica.

Glaucoma, with its 14 per cent., occupies the second place in the series of the causes of blindness in the Breslau statistics. This percentage would be still larger if we were to make the term blindness more comprehensive. The female sex shows a decided tendency to the acquisition of glaucoma; for while there are 17.34 per cent. of glaucomatous blind among the women, the men have only 10.78 per cent. This fact, moreover, is true also in a more general sense; thus, according to my investigations, about 1.296 per 10,000 women in Silesia became blind from glaucoma, while only .944 per 10,000 men lost their sight by this disease. Of our 28 glaucomatous blind, 14 had undergone iridectomy, 9 in both, 5 in one eye. One of them had iridectomy performed twice on one eye, while others had been subsequently subjected to sclerotomy. The thirty-seventh year is given as the earliest occurrence of glaucomatous blindness.

In 14 cases the blindness of both eyes ensued either simultaneously or in so rapid succession that the patients were unable to give definitely the space of time intervening between the affection of the two eyes. In 2 cases, one year intervened between the blindness of the one and that of the other eye; in 3 cases, glaucoma of the second eye occurred two years after loss of sight in the first. In one case, 6; in another, 9; and in a third, 15 years intervened between the blindness of the two eyes. In 2 cases the left eye was first affected; in 6 cases, the right.

Idiopathic diseases of the uveal tract furnished 4.90 per cent. of male and 8.14 per cent. of female blind. I am strongly inclined to doubt that all persons who in our city have lost their sight by uveal disease, have suffered from idiopathic forms of disease. There are among them undoubtedly persons with syphilitic infection, but I could demonstrate it in only one case.

Detachment of the retina contributes the high figure of 9.0 per cent., the male sex being represented by 10.78 per cent., and the female sex by 7.15 per cent. Of the 18 persons who became blind by detachment of the retina, 16 state

positively that they had been more or less myopic before the occurrence of the amaurosis. Two are absolutely unable to give any information as to former myopia. Three of our blind people have lost only one eye by detachment of the retina; the second eye by some other cause—viz., 2 by trauma, while the third was congenitally amaurotic on one eye. In 4 persons the detachment occurred on both eyes in the same year in rapid succession. In 8, a variable lapse of time intervened between the detachment of the retinæ of the two eyes—viz.:

1	year	in 1	person.
2	years	" 2	persons.
3	"	" 2	"
15	"	" 1	person.
18	"	" 1	"
22	"	" 1	"

The earliest occurrence of detachment was in the fourth year of life.

I may be permitted to call attention to two cases which might not be without interest with reference to the etiology of detachment of the retina. Two sons of a high official became blind by a detachment of the retina—one in the ninth, the other in the twelfth year of life, the right eye having previously been lost by trauma. The one had lost the right eye in the eighth year by a dart, the left becoming blind in the twelfth year by detachment of the retina; the other had likewise lost the sight of the right eye in the eighth year by a blow with a knotted handkerchief, and the left eye became blind in the ninth year by detachment of the retina. The parents of these two unfortunate victims of a truly tragical fate were not myopic, as I was assured; to what extent the sons had previously been myopic can no longer be definitely determined. In the family in question there are altogether five children, two of whom are above mentioned as blind, two have normal vision, while the fifth child, a girl, is very myopic, and has likewise lost one eye by detachment of the retina in her sixteenth year. In view of such frequency of

this affection in one family, one is almost involuntarily led to suspect that under certain circumstances hereditary factors manifest themselves in detachment of the retina, such as are positively demonstrated in other forms of blindness—*e. g.*, retinitis pigmentosa, atrophy of the optic nerve, etc.

GROUP 3.—*Traumatic blindness* furnishes for the male sex 9.80 per cent., for the female sex 4.08 per cent., of cases of blindness. This predominance of the male sex is readily explained by the occupation. This relation, moreover, applies also to the province of Silesia in general, as is shown by my former investigations. *Direct injury to the eye* occurred in four cases, all males; three of them received their injury in their occupation; two were burns by lime; one, a cooper, lost his sight by the penetration of a splinter of iron into the right eye, while the left eye had been previously destroyed, in the fourteenth year, by a blow received in playing ball. The one case of traumatic blindness, in which the injury was not received in the occupation, was that of a farmer, whose sight in both eyes was destroyed by a blow with the fist.

Three inhabitants of Breslau—all males—became blind by sympathetic ophthalmia. I gathered the following information regarding the nature and date of the traumatic blindness of the first, and the occurrence of the sympathetic affection of the second eye:

Loss of the right eye in the fifteenth year by explosion of gunpowder; onset of sympathetic ophthalmia three or four months later.

Loss of the left eye in the nineteenth year by a fall on the head; onset of sympathetic ophthalmia three years later, in the twenty-second year.

Loss of the right eye in the eleventh year by a knife-thrust; onset of sympathetic ophthalmia seven years later, in the eighteenth year.

Blindness from failure of operations is represented by a percentage of 3.5—males, 2.94%; females, 4.08%. This remarkably high percentage, however, is very much reduced by the explanation that only two persons lost both eyes by operative interference, while the remaining five lost only

one eye in this way. Two of these persons had formerly submitted to a cataract operation, owing to the failure of which they lost courage and would not subject the other eye, which, since then, had likewise become cataractous, to the operation. Despite all the solicitations of the relatives and the physician, they refused extraction of the second eye, and, at present at least, the idea of an operation cannot be entertained, since they have become very infirm in consequence of their great age—82 and 86 years, respectively. In three other persons, only one eye has been lost by a cataract-operation; the other by a different cause, viz.: in one by trauma, in the second by some inflammatory process, while the third was congenitally blind in one eye. Therefore, only two persons remain who have lost both eyes by operations. They are women. One of them became blind in consequence of cataract-extraction—both eyes in this case were operated according to Graefe's method, at different times. In the other case, depression of the cataractous lens was attempted in each eye, now thirty-five years ago. It is noteworthy that this patient is still subject to occasional acute inflammation in one or the other eye, with profuse hemorrhages into the anterior chamber; thus she was forced a short time age to seek medical aid again for a very painful inflammation of the left eye, associated with hæmophthalmus. As I was the attending physician in this instance, I was able to convince myself by personal observation of the intensity of the inflammatory process.

GROUP 4.—*Blindness due to general diseases.* Among our blind there are four persons, *i. e.*, 2.0%, in whom the loss of sight can be possibly traced to syphilis. However, I am inclined to believe that these four persons do not by any means represent the only victims of syphilis in our city; for under the heads of uveal diseases and of atrophia optica genuina and tabica, I have found persons in whom the suspicion of syphilitic disease appeared to be well-founded, though I was unable to obtain a reliable history. Other authors have observed syphilis to play a much more important part in the production of blindness; thus van

Millingen,[1] among 116 cases of blindness examined in Constantinople during 1880 and 1881, found 14.7% caused by syphilis. Of the four cases of syphilitic blindness examined by me, two could be traced to atrophia nervi optici tabica; in one case there was optic-nerve atrophy without tabes, and in the last case recurrent iritis was the cause of the amaurosis. According to Table II., the sexes were nearly equally represented.

Scrofula could in only two cases be positively assumed as the cause of blindness. Both these cases showed a certificate by the physician formerly in attendance, which gave the nature of the disease.

Diseases of the brain and its meninges led to amaurosis in six persons, *i. e.*, 3.0%. Five of these were cases of atrophy of the optic nerve which had occurred in childhood, in the course of a severe general disease, in four of the cases. In the fifth person, the blindness had occurred in the twenty-fourth year, and was associated with violent headache, and hemiplegia of the entire left side; even now the patient, at present fifty-eight years old, suffers still with paralysis of the left upper extremity. Finally, in the sixth case, iridochoroiditis from meningitis was the cause of blindness.

Tabes is represented in fourteen cases of Breslau's blind population, *i. e.*, 7.0%; or in 8.82% of the males and 5.10% of the females. But to these fourteen tabic blind persons should be added two others, one male and one female, who have been already enumerated under the head of syphilis and who acquired tabes through this disease. As a matter of fact, therefore, there are among our population sixteen affected with atrophia nervi optici tabica, or 8.5%. Accordingly, tabes plays a very important part among the 200 blind inhabitants of Breslau. What, if any, conclusions can be drawn from this fact as to the ophthalmo-sanitary conditions of our city, we shall investigate in the following pages. At all events, other authors have found a smaller percentage of amaurosis spinalis in their material; thus Bäuerlein[2] found only six cases of atrophia optica spinalis among 184 blind per-

[1] van Millingen, "Bericht der Privat-Augenheilanstalt in Constantinopel für das Jahr 1882." Salzburg, 1883. Graphische Darstellung 2.

[2] *Loc. cit.*, pp. 25 and 26.

sons, or 3.26%. Let us try to ascertain the percentage of tabes in optic-nerve atrophy in general. Altogether there are forty-eight cases of amaurosis in our Breslau material, in the following forms:

				Per Cent.
Atrophia nervi optici	congenita	. . .	4	= 8.33
" " "	genuina	. . . .	19	= 39.58
" " "	cerebralis	. . .	5	= 10.41
" " "	tabica	. . . .	16	= 33.33
" " "	syphilitica	. . .	1	= 2.08
" " "	e morbillis	. . .	1	= 2.08
" " "	e typho	. . .	2	= 4.16

According to the above-cited communication of Bäuerlein, there were observed in Würzburg, among 184 cases of amaurosis, forty-three due to atrophy of the optic nerve, in the following forms:

				Per Cent.
Atrophia nervi optici	congenita	. . .	3	= 6.97
" " "	genuina	. . . .	16	= 37.20
" " "	cerebralis	. . .	18	= 41.86
" " "	spinalis	. . . .	6	= 13.95

While, according to these observations of Bäuerlein, spinal atrophy plays no particularly prominent part, its proportionate percentage is much higher according to v. Graefe[1] and Leber[2]; the former gives the percentage of atrophia tabica, as compared with the other forms of atrophy, as about 30, and Leber as 26%. These percentages would approximately agree with that obtained by me for Breslau.

I might add that one of my cases charged the hardships of the late French war with being the cause of his tabes. In three other cases, the amaurosis was the first symptom of tabes and was of more or less long standing—in one case ten years, in the other two more than two years—before the tabic cause of the visual disturbance was recognized as such.

Measles caused blindness six times, *i. e.*, in 3%. In one case the amaurosis was due to atrophy of the optic nerve, while in the other cases the blindness was the result of destruction of the cornea.

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[1] v. Graefe, "Progressive Amaurose durch Atrophie de Sehnerven." *Klinische Monatsblätter f. Augenheilk.*, Bd. III., p. 201.

[2] *L. c.*, p. 873.

TABLE III.

Causes of Blindness among the 151 *Persons whose Infirmity was Acquired in Breslau.*

(72 *Males*, 79 *Females.*)

	I. Total numbers.	II. Males.	III. Females.
Congenital	11= 7.23 %	6= 8.21 %	5= 6.45 %
Atrophia nervi optici congenita	4= 2.63	3= 4.10	1= 1.26
Retinal atrophy	2= 1.31	2= 2.73	. . . .
Retinitis pigmentosa	4= 2.63	1= 1.36	3= 3.79
Buphthalmus	1= 0.65	. . . .	1= 1.26
Idiopathic Diseases of the Eyes.	81=53.28 %	35=47.94 %	46=58.22 %
Blennorrhœa neonatorum	14= 9.21	3= 4.10	11=13.91
Trachoma	1= 0.65	1= 1.36	. . . .
Atrophia nervi optici genuina	13= 8.55	8=10.95	5= 6.32
Glaucoma	22=14.47	9=12.92	13=16.45
Retinitis pigmentosa acquisita	2= 1.31	1= 1.36	1= 1.26
Iritis	3= 1.97	2= 2.73	1= 1.26
Irido-choroiditis	4= 2.63	1= 1.36	3= 3.70
Choroiditis	4= 2.63	1= 1.36	3= 3.79
Choroiditis myopica	2= 1.31	. . . .	2= 2.53
Sublatio retinæ	16=10.52	9=12.32	7= 8.86
Injuries	13= 8.55 %	9=12.32 %	4= 5.06 %
Injuries of the eyes or of the head	4= 2.63	4= 5.47	. . . .
Operations	7= 4.60	3= 4.10	4= 5.06
Ophthalmia sympathica	2= 1.31	2= 2.73	. . . .
General Diseases	33=21.85 %	19=26.02 %	15=18.98 %
Syphilis	2= 1.31	. . . .	2= 2.53
Scrofula	2= 1.31	1= 1.36	1= 1.26
Cerebrum and meninges	5= 3.28	4= 5.47	1= 1.26
Spinal cord (Tabes)	10= 6.62	7= 9.58	4= 5.06
Morbilli	6= 3.96	4= 5.47	2= 2.53
Scarlatina	1= 0.65	. . . .	1= 1.26
Variola	2= 1.31	. . . .	2= 2.53
Exanthema—nature unknown	1= 0.65	1= 1.36	. . . .
Typhoid fever	3= 1.97	2= 2.73	1= 1.26
Pregnancy	1= 0.65	. . . .	1= 1.26
Unknown Causes	13= 8.55 %	4= 5.47 %	9=11.39 %

Scarlatina furnishes only one case of blindness; one eye of this patient was phthisical, the other showed evidences of a former irido-choroiditis.

Small-pox was the cause of blindness in two cases. One

of them was attacked by the disease in the seventh, the other in the first, year of life; neither of them had been vaccinated.

Typhoid fever caused blindness in three cases, two by atrophy of the optic nerve, one by an inflammatory process of the uveal tract.

One woman lost her sight by *hemorrhage*. In this case the amaurosis occurred suddenly in the ninteenth year during the night, and was associated with violent hæmatemesis and bloody stools. When I examined it, the eye presented the typical appearance of optic-nerve atrophy.

During *pregnancy*, one woman became blind in her forty-second year. In the sixth month of her second pregnancy she was affected with bilateral irido-choroiditis which terminated in amaurosis.

b.—What Conclusions can be Drawn from our Statistics as to the Ophthalmo-Sanitary Conditions of the City of Breslau?

Under this head we can consider only persons who became blind in Breslau under the ophthalmo-hygienic conditions prevailing there. I have eliminated, therefore, from Table II., which comprises all the blind domiciled in Breslau, every person whose infirmity was acquired elsewhere, and grouped the remainder in Table III. This table comprises 151 persons, and Plate XII. reproduces its relations in a graphic form.

Let us try to draw some conclusions as to the ophthalmo-sanitary conditions of the city of Breslau from the preceding table and the graphical representation in Plate XII.

Group 1, congenital blindness, shows per 10,000 inhabitants of Breslau, 0.40.

Group 2, blindness due to idiopathic diseases of the eye, shows per 10,000 inhabitants of Breslau, 2.96.

Group 3, traumatic blindness, shows per 10,000 inhabitants of Breslau, 0.47.

Group 4, blindness due to general diseases, shows per 10,000 inhabitants of Breslau, 1.20.

For the several forms of these groups the following relations appear:

Representation of the Average Numerical Value of Each Cause of Blindness.

Of each 10,000 inhabitants of Breslau there become blind by—

Blennorrhœa neonatorum	0.51	Operations	0.29
Trachoma	0.03	Ophthalmia sympathica	0.06
Atrophia optica genuina	0.47	Syphilis	0.06
Glaucoma	0.80	Scrofula	0.06
Retinitis pigmentosa	0.06	Diseases of the brain	0.15
Diseases of the uveal tract	0.47	Tabes	0.36
Sublatio retinæ	0.58	Acute exanthemata	0.36
Injuries	0.12	Typhoid fever	0.09

4.—THE RELATIVE AGES OF THE BLIND.

The relations of age to blindness culminate mainly in the following two questions:

QUESTION 1.—*What proportionate amount of blindness exists in the several classified ages?*

The first class, from 0–10 years, contains 10 blind;[1] the census enumerates of this class for Breslau, 58,753; hence per 10,000 of this class, 1.70 blind.

The second class, from 10–20 years, contains 9 blind among 48,484; per 10,000 of this class, 1.85 blind.

The third class, from 20–30 years, contains 9 blind among 56,853; per 10,000 of this class, 2.63 blind.

The fourth class, from 30–40 years, contains 16 blind among 43,898; per 10,000 of this class, 3.64 blind.

The fifth class, from 40–50 years, contains 23 blind among 29,376; per 10,000 of this class, 7.82 blind.

The sixth class, from 50–60 years, contains 23 blind among 19,520; per 10,000 of this class, 11.78 blind.

The seventh class, from 60–70 years, contains 27 blind among 11,160; per 10,000 of this class, 24.19 blind.

The eighth class, from 70–80 years, contains 21 blind among 3,951; per 10,000 of this class, 58.21 blind.

The ninth class, from 80–90 years, contains 7 blind among 720; per 10,000 of this class, 97.22 blind.

The preceding tabulation shows that the proportion of blindness rises steadily from class to class; this increase is

[1] In this tabulation only those persons were counted who acquired their blindness in Breslau.

gradual to the end of the fourth class, but becomes more rapid with the beginning of the fifth class, and still more so with the seventh class. In the last three classes the rise is exceedingly rapid. The curve on Plate XIV. delineates these relations graphically.

QUESTION 2.—*What tendency have the classified ages to become blind?*

In order to ascertain with accuracy the liability of the classified ages to become blind, it is necessary to determine the onset of the blindness precisely. The proportion of those who become blind at the respective ages is easily calculated from the number of that class contained in the population. With a view to determine these relations with the greatest accuracy, I have, after completing the calculation by decades, reconsidered the first thirty years of life by lustra.

The Tendency to Blindness of the Several Ages Determined by Decades.

In the class from 0–10 years, 39 became blind in Breslau; as Breslau contains of this class 58,753 persons, the rate per 10,000 is 6.63.

In the class from 10–20 years, 9 became blind in Breslau; as Breslau contains of this class 48,484 persons, the rate per 10,000 is 1.85.

In the class from 20–30 years, 10 became blind in Breslau; as Breslau contains of this class 56,853 persons, the rate per 10,000 is 1.75.

In the class from 30–40 years, 22 became blind in Breslau; as Breslau contains of this class 43,898 persons, the rate per 10,000 is 5.01.

In the class from 40–50 years, 21 became blind in Breslau; as Breslau contains of this class 29,376 persons, the rate per 10,000 is 7.14.

In the class from 50–60 years, 15 became blind in Breslau; as Breslau contains of this class 19,520 persons, the rate per 10,000 is 7.68.

In the class from 60–70 years, 24 became blind in Breslau; as Breslau contains of this class 11,160 persons, the rate per 10,000 is 21.50.

In the class from 70–80 years, 7 became blind in Breslau; as Breslau contains of this class 3,951 persons, the rate per 10,000 is 17.72.

The Tendency to Blindness during the First Thirty Years of Life Determined by Lustra.

In the class from 0–5 years, 35 became blind in Breslau; as Breslau contains of this class 32,687 persons, the rate per 10,000 is 10.70.

In the class from 5–10 years, 4 became blind in Breslau; as Breslau contains of this class 26,066 persons, the rate per 10,000 is 1.53.

In the class from 10–15 years, 5 became blind in Breslau; as Breslau contains of this class 23,114 persons, the rate per 10,000 is 2.16.

In the class from 15–20 years, 4 became blind in Breslau; as Breslau contains of this class 25,370 persons, the rate per 10,000 is 1.57.

In the class from 20–25 years, 4 became blind in Breslau; as Breslau contains of this class 30,907 persons, the rate per 10,000 is 1.29.

In the class from 25–30 years, 6 became blind in Breslau; as Breslau contains of this class 25,946 persons, the rate per 10,000 is 2.31.

Curves B and C, on Plates XV. and XVI., reproduce these results graphically.

On comparing the curves with the results obtained by me in former investigations with reference to the relations existing between blindness and age, we find them to agree pretty closely.

In the first place, as regards curve A, which represents the ratio of blindness in the several classified ages, I have found precisely similar results on former occasions. For the law which I have formulated in reference to this point at that time[1] was: "The ratio of blindness increases constantly from the first year of life on, the rise being gradual to about the sixtieth year, but very rapid after that year," and that found in my present statistics differs in no particulars.

I notice, however, some differences between curve B and my statements at a former time[2] as to the liability to become blind.

[1] *Loc. cit.*, p. 233. [2] *Loc. cit.*, p. 240.

In my former publication I had found:

1. "In the first lustrum the danger of blindness is greatest."

2. "From the fifth to the twentieth years the danger of blindness is relatively the smallest."

3. "From the twentieth to the fiftieth years the danger of blindness rises constantly but not rapidly."

4. "From the fiftieth to the seventieth years the danger of blindness rises rapidly."

5. "From the seventieth year on, the danger of blindness seems to diminish."

Postulates 2, 3, 4, and 5, formulated at a former time, agree very well with my present results. But postulate 1 deviates somewhat from the result of the present statistics, according to which it is not the first lustrum, but the tenth and eleventh years which present the greatest danger of blindness. This difference between my two observations might possibly lie in the peculiarity of the Breslau material. According to Table III., it is not blennorrhœa neonatorum which plays the chief part in the production of blindness, but glaucoma. The speedy medical aid afforded by every large city, and hence also by Breslau, to blennorrhoic children must certainly have a reducing effect on the number of cases of blindness due to blennorrhœa. If this be granted, it will appear quite natural that, though in Breslau the first lustrum is represented by a high figure, it is not the one during which the danger of blindness is greatest. My former statistics were by no means exclusively based on the large cities, but on the contrary the provincial population was very fully represented. Therefore, my present results, according to which the danger of blindness is great, though not greatest during the first lustrum, must be looked upon as a peculiarity of the statistics—based exclusively on the blind of a large city.

5.—THE RELIGIOUS PERSUASION OF THE BLIND.

A great many writers have repeatedly asserted that the members of some religious bodies, especially the Jews, possess an especially large ratio of all bodily infirmities. The

most recent publications of the Royal Prussian Statistical Bureau likewise occupy this standpoint, and Guttstadt[1] gives the ratio of blindness among Christians and Jews as follows:

There are per	10,000 Protestants . .	8.2 blind.
" " "	10,000 Catholics . .	8.4 "
" " "	10,000 Jews . . .	11.0 "

These communications have induced me to inquire into these relations also in Breslau, and I have arrived at the following results:

According to the last census of 1880, there lived in Breslau 17,445 Jews, among whom I found 18 blind; hence there are 10.31 blind per 10,000 Jewish inhabitants of our city.

According to the same census, Breslau contained 254,122 Protestant and Catholic Christians, among whom I found 182 blind; hence there are 7.16 blind per 10,000 Christian inhabitants of Breslau.

These figures prove that in Breslau blindness is much more prevalent among the Jews than among the Christians.

I have, moreover, endeavored to ascertain the percentages of the several forms of blindness found among the Jews. In order to render a comparison possible with the Christian blind, I have also determined the corresponding forms among the Christians, and have placed the figures side by side.

	There are blind in Breslau per 10,000 Christians.	10,000 Jews.
Blennorrhœa neonatorum	1.10	0.57
Glaucoma	0.90	2.87
Atrophia optica (all forms)	1.41	2.87
Sublatio retinæ	0.62	1.14
Diseases of the uveal tract	0.55	0.57
Operations	0.19	1.14
Born blind	0.31	0.57
Unknown cause	0.66	0.57

[1] Guttstadt, "Die Verbreitung der Blinden und Taubstummen nach der Volkszählung vom 1. December 1880 und ihre Unterrichtsanstalten bis zum Jahre 1883 in Preussen."—*Zeitschrift des Königlich preussischen statistischen Bureaus*, Jahrgang XXIII., Heft 1 u. 2, Berlin, 1883, pag. 195.

A glance at the above table shows that it is particularly glaucoma and atrophy which, at least in Breslau, levy a higher tribute from the Jews than from Christians. Besides, some authors have formerly repeatedly pointed out that the Jews exhibit a predominating tendency to acquire glaucoma.

Recently Reich (*Centralblatt für praktische Augenheilkunde*, 1884, Oct., p. 318) has demonstrated that in the district of Kiew the Jews show a smaller ratio of blindness than the Christians; in that locality the Jews number 3.5 times less blind persons than the Christians. Unfortunately, Reich's material is insufficient for the determination of the percentages of the several forms of blindness for Christians and Jews. Reich's communications lead me to suspect that possibly the great prevalence of blennorrhoic blindness which seems to exist in the neighborhood examined by this author might explain the comparative immunity of the Jews. For, according to my experience in Breslau, blennorrhoic blindness is more frequent among the Christians.

6.—LONGEVITY OF THE BLIND AND DURATION OF THE SEVERAL FORMS OF BLINDNESS.

According to the official reports made to me by the Police Department of this city, 40 have died since 1880 of the 200 persons then recorded as blind. Since, however, as we have seen in § 2, of these 200 blind people fully 17 % must be deducted as erroneously included among them, the 40 deaths would be reduced to about 33—that is to say, from 1880 to the present time 33 really blind persons have died. Calculating therefrom the ratio of mortality per 10,000 blind, we obtain 471 per annum. There died in Breslau from 1872 till 1882 annually per 10,000 inhabitants ad maximum 349 (1872) and ad minimum 304 (1874). Accordingly the ratio among the blind considerably exceeds the maximum mortality of the inhabitants of our city. The cause of this circumstance may be ascribed to the fact that many cases of blindness result in consequence of pathological processes, which impair the vitality of the organism to a greater or less extent. The death of a person whose

blindness was due to such a cause, therefore, is less the effect of the amaurosis on the organism than it is the result of the general disease, to which the amaurosis was likewise due.

Were I to recapitulate what I have learned in regard to the mortality of the blind from my Breslau statistics, I should say:

The loss of vision *per se* seems to exert no shortening effect on the duration of life.

The mortality of the blind seems to be rather larger than that of persons whose sight is preserved.

I may be permitted to revert briefly to the *duration of blindness* in general and that of the several forms of blindness. The 280 blind residents of Breslau show the following:

Duration of blindness.	Number blind.	Duration of blindness.	Number blind.
5 years	62	40 years	15
10 "	52	50 "	2
15 "	58	60 "	4
20 "	49	70 "	2
25 "	25	80 "	1
30 "	10		

This table shows that, as Zehender[1] had likewise found, the duration of blindness for five, ten, and fifteen years is the most frequent; thenceforward it begins to decline, and a duration of more than forty years seems to be on the whole rather rare.

As regards the duration of the several forms of blindness, the following proportion appears for the principal forms:

	Average duration.
Blennorrhœa neonatorum (29 cases)	30.55 years.
Congenital blindness (12 cases)	22.83 "
Blindness due to uveal diseases (16 cases)	17.37 "
Atrophia optica genuina (19 cases)	10.75 "
Glaucoma (28 cases)	7.92 "
Sublatio retinæ (18 cases)	7.27 "
Atrophia optica tabica (14 cases)	7.15 "

[1] *Loc. cit.*, p. 35.

7.—THE SILESIAN INSTITUTE FOR THE BLIND.

In the beginning of the year 1884, when I examined the Silesian Institute for the Blind, it contained 87 inmates—52 boys and 35 girls. The following table represents the causes of blindness among the 87 pupils of the institute, and Plate XIII. delineates the same relations graphically:

TABLE IV.

Causes of Blindness among the 87 Pupils of the Silesian Institute for the Blind, at Breslau.

(52 *Boys*, 35 *Girls.*)

	I. Total number.	II. Boys.	III. Girls.
Congenital	10=11.49 %	3= 5.76 %	7=20.00 %
Microphthalmus	4= 4.59	. . . . .	4=11.40
Anophthalmus	2= 2.29	1= 1.92	1= 2.86
Choroiditis	1= 1.14	. . . . .	1= 2.86
Cataracta congenita complicata	3= 3.44	2= 3.84	1= 2.86
Idiopathic Diseases of the Eyes	26=29.88 %	14=26.92 %	12=34.28 %
Blennorrhœa neonatorum	24=27.58	14=26.92	10=28.57
Choroiditis myopica	1= 1.14	. . . . .	1= 2.86
Sublatio retinæ	1= 1.14	. . . . .	1= 2.86
Injuries	10=11.49 %	8=15.38 %	2= 5.76 %
Injuries of the eyes or of the head	3= 3.44	2= 3.84	1= 2.86
Operations	1= 1.14	1= 1.92	. . . . .
Ophthalmia sympathica	6= 6.89	5= 9.61	1= 2.86
General Diseases	34=39.08 %	21=40.38 %	13=37.14 %
Scrofula	5= 5.74	3= 5.76	2= 5.71
Cerebrum and meninges	12=13.79	7=13.46	5=14.28
Morbilli	6= 6.89	3= 5.76	3= 8.57
Scarlatina	3= 3.44	3= 5.76	. . . . .
Variola	8= 9.19	5= 9.61	3= 8.57
Unknown Causes	7= 8.04 %	6=11.53 %	1= 2.86 %
Totals	87	52 boys.	35 girls.

1. *Congenital blindness* is represented by 11.49 per cent. The fact that the boys have 5.76 per cent. and the girls 20.0 per cent. of congenital amaurosis is probably merely acci-

dental; at least Tables II. and III. exhibit no such difference. In the case of congenital blindness, the most important question undoubtedly is that of hereditary disposition; this can be demonstrated in 30 per cent. of our cases—viz., of two pupils of the institute the father is congenitally blind; in the third case both parents have good vision, the hereditary tendency manifesting itself only in that a second child was likewise born blind and at the same time mentally unsound.

As regards consanguinity of the parents in all the ten cases, the statements are so conflicting that we would not be justified in basing deductions on them.

Most frequent among the ten cases is malformation of the entire globe, viz., six instances—four of microphthalmus and two of anophthalmus. Then we have one case of bilateral coloboma iridis congenita with congenital cataract, nystagmus, and absolute amaurosis. But the globes in this case did not exhibit any marked disproportion in size. Congenital choroiditis was observed in one case; also one case of atrophy of the optic nerve, and in the tenth case the cause of the congenital amaurosis could not be determined, owing to bilateral opacity of the lens.

2. *Blindness due to idiopathic diseases of the eyes* is represented by three forms only—viz., blennorrhœa, sublatio retinæ, and choroiditis myopica.

Blennorrhœa neonatorum furnishes twenty-four cases, fourteen boys and ten girls; the percentages are, for the male pupils, 26.92%; for the female pupils, 28.67%. In none of these children is there any prospect of improving the sight by an iridectomy; in three of the cases the operation had been attempted, but of course without appreciable result. In by far the majority of the cases there is more or less advanced phthisis of the globe.

Detachment of the retina is given in one case as the cause of blindness; it is said to have occurred in the fifth year of life, but the patient, now seventeen years old, is unable to supply accurate information.

Choroiditis myopica caused loss of sight, in the sixteenth year, in a girl now twenty years old.

3. *Traumatic blindness* is represented by ten cases. There

are three direct injuries of the eyes or the head among them; in one case the left eye was lost by blennorrhœa neonatorum, the right eye by a blow with a stick during play. In another case bilateral amaurosis occurred in the eighth year of life by the explosion of percussion caps. Finally, in the third case, a stableman, aged eighteen years, had been kicked on the head by a horse and became blind in consequence thereof. The eyes showed traces of irido-choroiditis.

Sympathetic ophthalmia furnished the cause of blindness in six cases. The following tabulation gives the essential particulars of these cases:

Left eye became blind in the	9th	year by being hit with a piece of ice; one half year later, sympathetic ophthalmia.
" " " " " "	8th	" by a knife thrust; 2 years later, sympathetic ophthalmia.
" " " " " "	3d	" by a stab with scissors; 7 years later, sympathetic ophthalmia. (The right eye had been enucleated without effect.)
" " " " " "	1st	" from unknown cause; 14 years later, sympathetic ophthalmia.
" " " " " "	5th	" from unknown cause; 17 years later, sympathetic ophthalmia.

The particulars of the sixth case are not known; the left eye had been the first to become blind and had been enucleated, but without saving the right eye.

By *operation* one boy, in his eighth year, became blind in both eyes. From what can be learned, a bilateral discision of a cataract seems to have been performed. What if any complication caused the termination in amaurosis cannot be definitely ascertained from any source. At present both eyes show the residues of a past irido-choroiditis.

4. The cases of blindness due to *small-pox* are of particu-

lar interest. The eight cases observed furnish the following results as regards vaccination:

1st	case	became	blind	in the	4th	year; vaccinated.
2d	"	"	"	"	3d	" vaccinated.
3d	"	"	"	"	5th	" vaccinated twice, in the first and second year, in both instances ineffectually.
4th	"	"	"	"	5th	" vaccinated, but ineffectually.
5th	"	"	"	"	1st	" successfully vaccinated before.
6th	"	"	"	"	1st	" not vaccinated.
7th	"	"	"	"	3d	" not vaccinated.
8th	"	"	"	"	3d month	; not vaccinated.

In the nine pupils of the institute who became blind in consequence of *measles* and *scarlet-fever*, disease of the cornea always formed the starting-point of the amaurosis.

The *brain* with its meninges caused blindness in twelve cases, the eyes being affected in four cases with iridochoroiditis, and in eight cases with optic-nerve atrophy.

Scrofula led to blindness in five cases. In all of them, the cornea showed large leucomata. Iridectomy had been attempted in one case. In the cases under consideration, scrofula was given as the cause of the blindness in the records of the institute.

The *onset of the blindness* could be positively determined from the records in all the pupils of the institute, and is as follows:

	Per Cent.
In the 1st year of life	42.50
" 2d " "	10.34
" 3d " "	6.89
" 4th " "	4.59
" 5th " "	5.74
" 6th " "	3.44
" 7th " "	2.29
" 8th " "	0.
" 9th " "	0.
" 10th " "	2.29
" 11th " "	1.14
Born blind	11.49

The proportion of the various causes of blindness in the several years of life can be pretty accurately studied in these statistics, at least for the first five years. Beyond the fifth year the statistics of the institute are no longer available, because the cases in the later years are too few to furnish reliable percentages.

I.

	Per Cent.
In the 1st year there became blind from blennorrhœa neonatorum	64.89
In the 1st year there became blind from diseases of the brain	10.80
In the 1st year there became blind from small-pox	8.10
" " " " " " " " measles	2.70
" " " " " " " " scrofula	2.70
" " " " " " " " injury	2.70
" " " " " " " " unknown causes,	8.10

II.

In the 2d year there became blind from diseases of the brain	33.33
In the 2d year there became blind from measles	22.22
" " " " " " " " scrofula	22.22
" " " " " " " " unknown causes,	22.22

III.

In the 3d year there became blind from diseases of the brain	16.66
In the 3d year there became blind from small-pox	33.33
" " " " " " " " measles	33.33
" " " " " " " " scarlatina	16.66

IV.

In the 4th year there became blind from diseases of the brain	25.00
In the 4th year there became blind from small-pox	25.00
" " " " " " " " unknown causes,	50.00

V.

In the 5th year there became blind from diseases of the brain	20.00
In the 5th year there became blind from small-pox	40.00
" " " " " " " " scarlet-fever	20.00
" " " " " " " " detachment of the retina	20.20

A CASE OF CONGENITAL TUMOR AND COLOBOMA OF THE UPPER LID.

By F. E. D'OENCH, M.D.

As cases of coloboma and congenital tumors of the lids are of rare occurrence, a description of the following one may be of interest.

Margaret C., æt. six months, was brought to the Dispensary of the N. Y. Ophthalmic and Aural Institute on account of a tumor of the left upper lid, which the mother declared was congenital, and at birth about two thirds of its present size. It sprang from the inner third of the lid, near the margin of the orbit, and, ordinarily, hung laxly over the eye. When, however, the child cried, it became turgid and stood out at right angles to the plane of the lid. This I attribute partly to the forcible closure of the lids, partly to a band of muscle-fibres running through the whole length of the tumor, as subsequently shown by the microscopical examination. Its general shape was cylindrical, with a constriction near the middle; the lower end was bulbous, and at its apex there was a pitlike circular depression about 3 *mm.* deep, probably due to the band of muscle-fibres already mentioned. The tumor was covered with normal skin and was soft to the touch. Its length was 24 *mm.*, the diameter of the cylindrical part 6 *mm.*, of the bulbed free end 10 *mm.*

The little tumor was removed without difficulty, and no reaction followed, except slight irritation of the wound, caused by the child's scratching it.

A microscopical examination of its structure was kindly made by Dr. T. M. Prudden, who found the following conditions:

"The nearly cylindrical tumor is 23 *mm.* long and 9 *mm.* in diameter at the broadest part. It is slightly constricted near the middle, slightly bulbed at the free extremity, and at the end there is a pit-like circular depression about 3 *mm.* deep.

"Microscopically the structure of the tumor is as follows:

"Longitudinally through the centre of the growth runs a narrow bundle of slender but well-formed striated muscle-fibres which turns a little to one side and spreads out fan-like towards the apex of the tumor.

"Running along with the muscle-bundle are an artery and nerve, both of considerable size.

"Close to the base of the tumor at the line of incision and near its axis is a very dense mass of connective tissue, enclosing two irregular masses of bone or osteoid tissue containing vascular marrow cavities. These bony masses are not lamellated and appear to be forming directly from the dense connective tissue which encloses them.

"Surrounding the central muscle-bundle and making up about one third of the mass of the tumor is a cylinder of fat and dense and loose connective tissue.

"The whole tumor is covered by skin, the corium of which is very dense and contains a large number of hypertrophied sweat glands. The papillæ are broad and well supplied with blood-vessels. The entire surface is moderately thickly beset with delicate hairs which rise from small and ill-developed hair follicles, into which open large numbers of rudimentary sebaceous glands.

"The peculiar depression of the surface at the free end of the tumor is apparently due to the action of the muscle-bundle which runs through the centre. The anatomical diagnosis would accordingly be *pendulous teratoma* of face."

Besides the tumor there is also a coloboma of the left upper lid, situated at the junction of the inner third and outer two thirds. It is about 5 *mm.* wide and 3 *mm.* high. The eyelashes are absent in its whole extent, only a few fine hairs projecting from its edge. The outer two thirds are fringed with normal lashes, but the inner third is only imperfectly supplied with them. There is no lachrymal point on the upper lid. The lower lid rises to a little peak opposite the coloboma, but is otherwise normal. From that part of the upper lid immediately above the coloboma a duplicature of mucous membrane passes to the eyeball, but does not extend to the corneal margin.

The face of the child is markedly asymmetrical. The left eye is situated much lower than the right, the lower edge of the iris of the right eye being about on a level with the upper edge of the iris of the left. The space between the bridge of the nose and inner canthus of the left eye is much wider than is usually the case, so that the eye seems pushed towards the temporal side. The left eyebrow sweeps down into this space, a tuft of fine hairs springing from the skin between the bridge of the nose and inner canthus. The cornea, iris, and lens show no changes; neither are there any at the fundus. The optic nerve is somewhat pale and fringed with black pigment. The pupil reacts promptly.

The mobility of the eye is much restricted. It can only be moved downward and outward, but never passes the median line.

The left ala nasi is not fully developed, and the left nostril is consequently somewhat smaller than the right. There is no hare-lip or cleft palate. The right eye is normal in every respect and moves freely in every direction. There are no other malformations, and the child seems to be about as intelligent as most children of its age. There is no consanguinity of the parents, both of whom are healthy and not affected with any malformation or arrest of development; their only other child, a girl, is also free from any abnormity.

Cases of coloboma of the lids are of comparatively rare occurrence, only thirty-two having thus far been described. Van Duyse[1] in a lengthy paper enumerates thirty cases, including his own, to which should be added two more cases —those of Gruening[2] and Snell,[3]— besides my own. The malformation is confined in the great majority of the cases (twenty-three among thirty-three) to the upper lids, in seven of these to both upper lids; the lower lid was affected in nine cases; and in one both the upper and lower lids of the same side. The male sex contributed fifteen cases; the female, ten; the sex of the remaining cases is not stated.

Manz and Wecker have drawn attention to the fact that almost every case of coloboma of the lids is associated with some abnormal growth, situated either on the globe itself or on the lids. Dermoid tumors in particular and allied

[1] *Ann. d'ocul.*, vol. lxxxviii., p. 101, 1882.
[2] *Arch. of Med.*, vol. iv., p. 44.
[3] "Trans. of the Ophth. Soc. of the United Kingdom," vol. iv., p. 348.

neoplasms are of frequent occurrence, having been observed in ten cases among the thirty-three; the relation, however, which they bear to the coloboma has not yet been explained in a perfectly satisfactory manner. Harelip, absence of the lachrymal points, and other arrests of development are also found in a number of cases.

These points, as well as the theories of the cause of coloboma of the lids, with the exception of that of Ewetsky,[1] who attributes it to interference with the closure of the lids while being drawn together by an epithelial membrane between them, are discussed at length in the paper of Van Duyse mentioned above, and I would therefore refer to it for the sake of avoiding repetition.

[1] ARCH. OF OPHTH., vol. viii., 4, p. 429.

REPORT OF TWO CASES OF INJURY OF THE EYE, WITH THE MICROSCOPICAL APPEARANCES AFTER THE ENUCLEATION.

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(*With two lithographic plates.*)

FOR the clinical history of the following case I am indebted to Prof. Hirschberg, of Berlin, in whose clinic it occurred:

CASE 1.—*Injury to cornea, iris, and lens. Suppurative internal inflammation.*

Curtis L., æt. seven years, residing near Berlin, was injured in the right eye by a needle-arrow from a blow-pipe, on the 27th of July, 1884. Patient entered Prof. Hirschberg's clinic July 28, 1884.

St. Pr.—At the upper, outer sclero-corneal junction there is a slight punctured wound, from which a small shred of tissue protrudes. A small opening through the iris is also visible. The lens is cataractous, aqueous slightly cloudy, and the pupil is partly occluded by what appears to be a portion of the vitreous.

From the appearance of the wound and surroundings, Prof. Hirschberg suspected infection of the deeper parts and gave an unfavorable prognosis.

Patient was put to bed, atropine solution instilled, and warm fomentations with chlorine-water kept up for some time, after which the eye was bandaged with dressings of corrosive sublimate.

July 29th.—Media a little clearer.

July 30th.—Pain in the globe. No chemosis.

Aug. 1st.—The vessels of the iris are very much enlarged.

Aug. 5th.—Tension of globe increased. Anterior chamber very shallow.

Aug. 7th.—Film excised.

Aug. 14th.—No perception of light. The pericorneal injection is very marked. Patient complains of great pain in the eye and in the right side of the head. The iris is pressed against the cornea apparently by a cyclitic exudation. Prof. Hirschberg considered the transmission of sympathetic inflammation to the other eye imminent and advised excision.

Aug. 16th.—Globe excised. A good recovery followed. The left eye remains normal.

Immediately after excision the globe was placed in Müller's fluid, and was in a good state of preservation when received by me.

Sections were made after treating the globe with alcohol and imbedding in celloidin.

Macroscopical appearance.—The globe is larger than normal; it measures 23.3 *mm.* in its antero-posterior diameter, and 24.3 *mm.* at the equator. At the upper, outer sclero-corneal margin, situated wholly within the corneal tissue, is a small, fresh cicatrix. The cornea in this immediate vicinity is slightly opaque.

On opening the globe a very great change in its contents is visible. The *cornea* is thickened in the vicinity of the wound. The *anterior chamber* is *shallow* and filled with a turbid fluid. The *iris* is adherent to Descemet's membrane at the upper, outer quadrant. The *lens* is greatly distorted (see plate 1, fig. i.); a small portion is detached from the body of the lens and is adherent to the posterior surface of the cornea at the point of injury. The lens is surrounded by an inflammatory exudation and by the vitreous and the retina. The *retina*, thrown into many folds, is connected with the uveal tract only at the ora serrata, and to the optic disc by a few shreds of connective tissue.

Between the choroid and retina is a yellowish, semi-translucent exudation, which has become firm by the action of the Müller's fluid. This exudation occupies three fifths of the entire interior of the globe and is wholly sub-retinal. The *choroid* is slightly thickened.

Sclerotic normal. *Ciliary* body swollen. The *optic nerve* appears to be normal.

Microscopical appearance.—The wound is directed from above downward and inward. The cornea, iris, and lens capsule were pierced. The cornea is normal, except in the vicinity of the perforation, where its lamellæ are swollen, the interlamellar spaces enlarged, and, at the margins of the wound, the corneal tissue infiltrated with white blood corpuscles and new connective-tissue cells. Bowman's membrane is irregular and broken at the point of injury, but epithelial cells may be traced over the surface of the cicatrix. Some small blood-vessels are noticeable in the new connective tissue. White blood corpuscles, scattered through the scar, are situated near its outer part and extend into it about one third the thickness of the cornea. Descemet's membrane can be traced to a distance of 1–3 *mm.* from the margins of the wound, where it is pressed upon and becomes incorporated with the iris. The anterior chamber is very shallow and contains a fluid rich in pus cells. The *iris* is thicker than normal and is pressed against the wound by a portion of the lens substance; none of the iris tissue, however, except a portion of pigment, can be detected in the tissue filling the wound. New connective-tissue cells and white blood-corpuscles are abundant throughout the iris, particularly in the tissue near the wound. The blood-vessels of the iris are engorged with blood corpuscles. Except at the part farthest removed from the point of injury, no trace of lens structure proper can be detected. At this part a portion of the lens fibres and part of the capsule may be seen. The mass representing the lens in other parts is infiltrated with white blood-corpuscles and its fibres are undergoing fatty degeneration. (See plate I., fig. 4). At the point of injury and on the surface of the lens the white blood-corpuscles are most plentiful. But little of the vitreous can be detected; it is closely surrounded by the retina, and is partly incorporated with the cyclitic exudation that covers the lens posteriorly.

The *ciliary body* is enlarged, and is densely infiltrated with white blood corpuscles. The muscular tissue is atrophic

and the blood-vessels are engorged with blood. There is no evidence of a wound in the ciliary body. The elements of the retina, except the nuclear layers, are very much changed. The rods and cones have disappeared. The pigment layer of the retina remains attached to the choroid.

The subretinal choroidal exudation before mentioned is albuminous, and contains a few pus cells. The *choroid* is thickened and infiltrated with white blood corpuscles; its vessels are engorged with blood, but do not appear to be changed in structure. The membrana chorio-capillaris has almost entirely disappeared. Large numbers of white blood corpuscles occupy the connective-tissue spaces between the bundles of the optic nerves in the vicinity of the cribriform plate of the sclerotic. The nerve fibres are not atrophic. No change can be detected in the tissue of the sclerotic, except that the blood-vessels are filled with blood corpuscles, and that near the ciliary body where the engorgement is very noticeable, the walls of the blood-vessels and the tissue immediately surrounding, show an increase in nuclei and an infiltration of white blood corpuscles. A number of white blood corpuscles are situated in the sheaths of the ciliary nerves, and the nuclei of the sheaths are increased in number. The proliferation of pigment cells, which is often seen in cases of this nature, is not present in this. The appearance of the tissue, after coloring with methyline blue, and treating with absolute alcohol, is largely indicative of the presence of bacteria, but the absence of groups and a lack of symmetry in the individual forms, renders it impossible to say that these bodies are bacteria. They stain an intense blue and with the Abbé condenser and oil emersion give an appearance as represented in No. 4, plate i.

In case No. 2, we get nothing resembling the condition just described.

For the history of the following case, from Prof. Schoeler's clinic, Berlin, I am indebted to Dr. W. Uhthoff, assistant to Prof. Schoeler.

CASE 2.—*Subconjunctival rupture of sclerotic and choroid. Extensive non-suppurative changes in the eyeball.*

Otto M., æt. fifty-five years, baker. On the 28th of Sept., 1884,

the patient received a blow from the horn of a cow, on the outer lower quadrant of the right eye. Patient entered the clinic shortly after receiving the injury. When first seen the anterior chamber was filled with blood ; pericorneal injection marked, with sub-conjunctival hemorrhage, and a diminution in the tension of the globe. A sub-conjunctival rupture of the sclerotic was diagnosed. The patient was put to bed, atropine solution instilled, and cold compresses applied. The blood in the anterior chamber was gradually absorbed, otherwise the condition of the eye remained unchanged for nearly three weeks. A red reflex was visible from the fundus. The lens had disappeared. Repeated hemorrhages now occurred accompanied with pain. After nearly eight weeks had elapsed, and the injured eye did not change for the better, enucleation was advised. The globe was excised by Prof. Schoeler on the 20th of Nov., '84, eight weeks after the occurrence of the injury. At the time of the enucleation the pericorneal injection was not intense ; cornea clear, some hyphæma with red reflex from the interior. The patient did not complain of pain. The eye after excision was placed in Müller's fluid and treated as in Case 1.

Macroscopical appearance.—The globe measured 23 *mm.* in its equatorial and 22 *mm.* in its antero-post. diameter. Cornea normal. In the sclerotic, at the outer lower quadrant, near the equator and running parallel with it, is a cicatrix, extending downward from the lower border of the tendon of the external rectus. The cicatrix measures 1 *mm.* in width and 12 *mm.* in length. On opening the globe the wound is found to extend through the sclerotic and choroid. The retina, however, is so changed that it is impossible to determine whether it is also lacerated. The anterior chamber from its lower part to the lower margin of the pupil is occupied by a clot. The iris is normal. The *lens* is dislocated downward, its upper margin corresponding to the upper margin of the pupil ; it is not changed in size or shape. (See plate II., fig. 1.) Posterior to the lens and separating it from the detached retina, is a blood clot, which is from 3 to 5 *mm.* in thickness. There is also a blood clot occupying the lower part of the globe which is 5 *mm.* thick. The choroid and the ciliary body appear to be normal. The retina is detached from the choroid except at the ora serrata, and is thrown into many folds around the disorganized vit-

reous, forming a cone, the base of which is directed toward the lens—the apex continuous with the optic nerve. The space between choroid and retina was occupied by a reddish serum which escaped when the globe was opened. The sclerotic is unchanged except in the vicinity of the rupture where it is twice the normal thickness.

Microscopical appearance.—The tissue of the cornea is intact. In the clot occupying the lower part of the anterior chamber, no pus cells or inflammatory products can be detected. The whole uveal tract, aside from the injured portion, is normal, except that it is in a state of congestion; all the blood-vessels being filled with blood corpuscles. The lens is complete in its capsule, and has undergone no retrogressive change. It is partly held in position by the fibres of the suspensory ligament which, not being ruptured, are inserted into the posterior capsule. The fibres of the suspensory ligament that insert themselves into the anterior capsule have disappeared. The before-mentioned clots, in the posterior segment of the eye, are composed simply of blood-corpuscles and fibrine. The preserved portion of the zonula seems to have prevented the free entrance of blood into the anterior chamber, The retina, although thrown into many folds, is not extensively degenerated. Each layer is distinct; even the layer of rods and cones is, in most parts, intact. The pigment layer of the retina remains attached to the choroid. At the point of rupture, the retina adheres to the choroid and sclerotic, but does not enter the wound. (See plate II., fig. 2.) No infiltration of white blood corpuscles can be seen in any of the tissues. The choroid at the wound is disorganized. The pigment cells and choroidal stroma can be traced into the wound. A large choroidal vein and some smaller vessels are included in the cicatrix at its inner surface. At the margins of the wound, a number of new connective-tissue cells appear between the fibre bundles of the sclerotic. The cicatrix is formed of new connective tissue. No evidence of pus formation is visible in any part of the eye. The tissues are in a state of simple congestion throughout. The optic-nerve fibres are atrophic. In the ciliary nerve trunks,

no noticeable change has taken place. It is impossible to state from which vessels the first hemorrhages occurred.

That infection plays a very active part in the production of suppurative processes, and that small wounds on the surface are much more productive of degenerative changes than are greater injuries which occur subconjunctivally, is fairly well illustrated by the above cases. In the first, from a comparatively small injury with kind healing of the wound, an irido-cyclochoroiditis was produced which necessitated enucleation in less than three weeks. The second, with far greater internal change, as a result of the injury, showed congestion only after the lapse of eight weeks. Prof. Hirschberg cites a number of cases, occurring in children, in which a comparatively slight injury to the globe, with kind healing of the wound itself, has resulted in destruction of the eye, and he expresses it as his opinion that such injuries, in children, are much more often disastrous than similar injuries when occurring in the adult.

The developing condition of the tissues in children undoubtedly renders them much more susceptible.

DESCRIPTION OF PLATES.

FIG. 1 (Plate i.).—1, 3, Sclerotic; 2, choroid; 12, sub-choroidal exudation; 4, conjunctiva; 5, wound; 6, lens; 7, cornea; 8, iris; 9, anterior chamber; 10, ciliary body; 11, 17, 14, retina; 13, 18, vitreous and cyclitic exudation together; 15, fibres to optic nerve; 16, nerve.

FIG. 2.—1, Surface epithelium with 3, Bowman's membrane; 2, wound; 4, cornea propria; 5, Descemet's membrane; 6, iris; 7, vessels of iris; 8, iris pigment; 9, corneal margins of wound; 10, blood-vessels in wound; 11, lens (portion of).

FIG. 3.—1, Cornea; 2, Schlemm's canal; 3, sclerotic; 4, iris; 5, vessels; 6, tissue of ciliary body infiltrated with white-blood corpuscles; 7, pigment of ciliary body.

FIG. 4.—Section near surface of lens. 1, Fat globules, showing fat crystals; 2, group of bodies resembling bacteria; 3, white-blood corpuscles.

FIG. 5.—1, Sclerotic; 2, 4, sheath of ciliary nerve; 3, ciliary nerve trunk; 5, very small blood-vessels.

FIG. 1 (Plate ii.).—1, Sclerotic; 2, ciliary body; 3, 6, and 8, blood-clots; 4, iris; 5, cornea; 7, lens; 9, rupture of sclerotic and choroid; 10, choroid; 11, retina; 12, optic nerve; 13, bloody serum.

FIG. 2.—1, Blood-clot; 2 and 3, retina; 4, pigment layer of the retina; 5, choroid; 6, pigment; 7, blood-vessels included in the cicatrix; 8, sclerotic; 9, margins of wound; 10, pigment included in the cicatrix.

REPORT ON THE OPHTHALMOLOGICAL DISCUSSIONS AT THE CONGRESS OF NATURALISTS AND PHYSICIANS AT STRASSBURG, 1885.

FROM THE JOURNAL BY C. HORSTMANN.

Translated by Dr. J. H. SHORTER, New York.

1. H. Knapp.—On a case of acute myelitis with double-sided ophthalmoplegia and choked disc. (Treated in common with Dr. Rudisch. Autopsy by Dr. Waldstein.)

In a man of thirty-two years, otherwise perfectly healthy, but who eight years previously had suffered with syphilis, there developed after an unusual bacchanalian debauch a gradual amaurosis and, at the same time, an ascending bodily paresis, commencing in the toes. On the fifteenth day a nuclear paralysis of the eye-muscles appeared, and on the seventeenth day bulbar paralysis, of which latter the patient died on the twenty-first day. Distinct double-sided choked disc followed the amaurosis. Large doses of mercury and potassic iodide had not had the slightest influence on the disease.

At the autopsy were found a distinct hyperæmia of the coverings of the spinal cord: copious discharge of turbid liquid on making incision; the dorsal and lumbar cord softened; the cervical, on the contrary, of normal consistence, but changed in color. The subarachnoid fluid of the brain was increased in quantity, and the pia mater at the base was hyperæmic.

The chiasma, the optic tract and nerve, seemed swollen, soft, and reddish-gray. The microscopic examination showed almost everywhere a considerable hyaline thickening of the intima of the arteries, with narrowed calibre; whilst the veins were distended, filled with blood, and plentifully surrounded by round cells.

In the chiasma and optic nerve the nerve fibres were destroyed,

the septa spread out, and, in addition, infiltration of round cells, endo-arteritis, and abnormal fulness of the veins.

2. Pflüger.—On periodical nuclear paresis. After speaking of eight cases already published of periodical nuclear paresis, Pflüger reported one observed by himself, which occurred in the case of an anæmic young lady of twenty-two.

Already four years before, after a pain in the region of the left eye, there appeared a paralysis of the left oculo-motor nerve, which lasted two months, and of the left facial nerve, which, after a duration of one month, disappeared. Two years later the same symptoms appeared, this time, however, on the right side. The third attack occurred six months ago, following severe pain in the face, and this time also it was again the right oculomotor and facial nerves which were paralyzed. There was no disturbance of vision, and ophthalmoscopic appearances were normal. The condition gradually improved, though three months later there was a relapse whereby the left facial and abducent nerves were also affected. The paresis thereafter slowly disappeared.

Pflüger is of opinion that the periodical paralysis of the oculomotor, abducent, and facial nerves is a nuclear paralysis. The disease process at the foundation of it distinguishes itself from the other forms of nuclear paralysis by its essential vaso-motor character.

3. H. Kuhnt.—Proposed modification of the iridectomy for optical purposes.

The smallest artificial pupil, and one most resembling a stenopäic slit, is certainly produced where nothing of the sphincter border is excised and from the iris stroma lying between the small iris circle and attached point only so much as the width of the incised margin of the sphincter in a case of ordinary iridectomy. Kuhut makes the external section in the usual way—4 to 5 *mm.* broad, with the forceps seizes the iris in an expanse of 1 to 1½ *mm.* about midway between the pupil and ciliary border, draws it gently forth, and removes it by a cut of the scissors exactly corresponding with the direction of the iris fibres.

After the reposition he goes in with a Wecker's scissors and divides the still remaining sphincter portion.

5. H. Kuhnt.—On scleral operations. To determine to what degree the sclera is accessible to operative encroach-

ments without doing injury to the remaining eye, Kuhnt made experiments on dogs.

He tried displacing neighboring scleral flaps with and without wounding the uvea, also with injury and perforation of the latter and of the retina, with consequent escape of vitreous. In addition to this he excised large and small pieces of the sclera, and covered in the defect simply with conjunctiva or with the sclera from another eye.

After displacement of pieces of sclera, even when with slight alterations in the uvea, the process healed without leaving any ophthalmoscopically visible trouble in the eye. After injury of the choroid there appeared sometimes a cloudiness of the lens which remained stationary. The transplanted pieces of sclera for covering over a defect healed rapidly in all cases. A change in the choroid could, in these cases, not be determined. Only the conjunctiva was thickened and grown fast to the transplanted part.

In a case of laceration and tearing out of a piece of sclera in the region of the ciliary bodies with, at the same time, corresponding destruction of the uvea and escape of vitreous, Kuhnt transplanted a piece of the sclera of an ox on to the human eye, which healed over by first intention, so that the shape of the eye and a slight amount of vision were preserved.

6. Manz.—On pseudo-coloboma of the iris.

The typical coloboma of the iris, with or without coloboma of the choroid, must, as to its origin, go back to the fœtal eye cleft. The nearest to this kind is the pseudo-coloboma, in which the layers of the embryonic iris are unevenly divided. Partial irideremia has nothing to do with the fœtal eye cleft but has connection probably with the fate of the pupillary membrane.

7. Ellinger.—The optical law for letters and writing.

Ellinger proclaims himself in favor of the Latin characters in opposition to those of the ordinary German hand-writing, as the latter makes about three times as much work as the former. He believes that the many eye-glasses in Germany can be set down to the account of the slanting zig-zag writing.

8. Pflüger.—Gun-shot wound of both occipital lobes.

A boy, sixteen years old, was shot in the back of the head, in

consequence of which complete blindness of both eyes ensued on the second day. The blinding depended on optic neuritis.

The patient died six weeks later. By the autopsy it was found that five small shot had penetrated the skull with splintering of the table; several had penetrated the dura mater, and were found with accompanying bony spiculæ in the substance of the cerebrum, and, in fact, in both the right and left posterior lobes, where they had caused their destruction.

9. Ulrich.—On choked disc.

In recent years Ulrich had opportunity in four cases to follow closely the development of choked disc, and in two cases to follow this with an exact anatomical examination. In all four cases the cause of the trouble was cerebral tumor.

He found, as first symptom of the approaching papillitis, a slight tortuosity of the retinal veins accompanying slight indistinctness of the pupillary margin. After a few days hemorrhages of striped nature appeared in vicinity of the optic disc. After this first began the swelling of the papilla which, by pushing out, attained the characteristic appearances.

In the anatomical examination the peculiar swelling of choked disc was apparent. This condition was dependent on hyperæmia; the vessels altogether were distended, filled with blood, and in their surrounding one found slight collections of leucocytes with here and there a perivascular œdema. Besides this hemorrhagic masses could be made out, which infiltrated the entire papilla. The most important share in the swelling was had by the serous infiltration and the degeneration of the nerve fibres. Hydrops of the optic-nerve sheath could not be made out; the optic nerve was, however, itself œdematous.

Ulrich is of the opinion that choked disc is the result of an œdema which is produced by venous stasis. The origin of this is to be recognized in the compression of the central vessels of the optic nerve trunk, which in turn may be referred to the œdematous condition of the nerve. The œdema of the optic nerve is to be recognized as a continuation of the œdema of the brain.

10.—Bayer (page 171 of the *Journal*). On changes in the fundus of the eye in sepsis.

In a series of cases of puerperal fever observed in the winter of 1880–81, there were found without exception changes in the fundus

of the eye; likewise in many lying-in women who were not septically diseased, whilst after that time no similar reports could be authenticated by the reporter. Of the conclusions to which he came the following are of especial interest:

1. Retinitis septica composed of hemorrhages and the so-called Roth spots is only pathognomonic of sepsis where all other diseased conditions which can give rise to similar pictures (nephritis, diabetes, leucæmia, etc.) are eliminated. In typhus this affection of the eye has never been observed. It appears as well in the phlebitic as in the lymphangitic form of puerperal fever.

2. In the ordinary panophthalmitis it is always a matter of supparative choroiditis, although this may not originate primarily in the choroid. One must distinguish between:

a.—Suppurative choroiditis. If not of traumatic nature, this proves certainly a septic disease and in many cases ulcerative endocarditis.

b.—Suppurative retinitis, which affects the choroid secondarily, and thus leads to the ordinary panophthalmitis, or may remain restricted to the posterior part of the eye. It begins as an embolic inflammation of the retina, leads to suppuration of the latter and seizes on to the vitreous and choroid. It shows always sepsis and perhaps without exception ulcerative endocarditis.

H. KNAPP.

11.—V. Gudden (page 136) reports on new investigations regarding the optic nerve, the optic tract, the relation of their crossed and uncrossed bundles, their optic and pupillary fibres, and the centres for the latter.

In the new-born animal one enters at the sagittal suture with a fine thin knife and divides the chiasma, at the base of the skull. In case of cats, as was demonstrated by this reporter, as well as by Dr. Ganser, the situation and behavior of the crossed and uncrossed bundles is essentially the same as in man (ARCH. OF OPHTH., vol. XXV., 4), that in this animal the decussation of the crossed and uncrossed bundles is effected in the entire cross-section of the nerves as they emerge from the chiasma, and that the relation, in size and number, of the crossed to uncrossed bundles in the cross-section, is as 5 to 3.

As already mentioned in a communication from von Gudden at the Congress at Eisenach, that by removing, without too deep a

seizure, the superior eminence of the corpora quadrigemina a rabbit is made blind on the opposite side, and without any effect on the mobility of the pupil. The optic nerve as found by the dissection is actually smaller, but contains normal nerve fibres. He had already, at that time, demonstrated the existence of two systems of fibres in the optic nerve: one system for vision and one which in a reflex manner controls the movement of the pupil! From the results of his investigations there must exist a third system with a third centre. The microscopical examination had as yet authenticated only two systems, the one in the corpus geniculatum externum, the other in the superior eminence.

It is an advance, the being able to demonstrate the two kinds of fibres, differing in calibre, most distinct in the cat, less distinct though still recognizable in man.

Dr. von Monakow (Zurich) said in opposition that he had found in high degrees of degeneration of one optic tract, in man, the secondary degeneration of both optic nerves restricted to particular bundles; on the undecussated side it was the dorsal-lateral, on the decussated side the "ventral-medial" cross-section, which was sharply circumbscribedly atrophic.

After removal of one eye (experimental) he saw the ganglion cells in the corp. gen. lat. of the other side beautifully preserved, but the gray substance had entirely disappeared, so that the somewhat puffed-up ganglion cells lay conspicuously close together.

H. KNAPP.

12.—Pflüger (Berne, page 257) reported the results of perimetric examinations as to the extent of the field of vision in hysterical and other nervous troubles.

He found that the mental condition is of great influence on the entire boundary of the visual field. In high degrees of depression the visual field contracts to a circle of three degrees radius.

His assistant, Dr. Schiele, examined a series of cases of hysteria, hypochondria, and neurasthenia by different methods, and came without exception to the same result, viz.: that the fatiguing of a half, of a quadrant, of a sector of one retina, brought after it a homonymous exhaustion of the other retina, in form of an analogous often strikingly similar shape of the contraction of the field of vision.

The exhaustion never encroached on the other half of the eye first fatigued—in opposition to Wilbrand;—not even on the ad-

jacent parts of the same field of vision. From this it is undoubted that the primary and secondary irritation, mostly in shape of fatigue, had its seat in the visual sphere, in the occipital lobe, and not in the retina; that the irritation in the cortex of the terminal organs corresponding to a special meridian, also excites the terminal organs of the homonymous meridian of the other retina.

The communication enters copiously into particulars of an experimental and theoretical nature concerning which we must refer to the original.

H. KNAPP.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE SECOND QUARTER OF THE YEAR 1885.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

with the coöperation of

C. E. Fitzgerald, Dublin; E. Marckwort and P. v. Mittelstädt, Antwerp; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjötz and Ole Bull, Christiania, etc.

Translated by Dr. F. E. D'Oench, New York.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

By H. MAGNUS, M.D.

a.—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

222. Adamük. Practical text-book of diseases of the eye, vol. i., part 2. Diseases of the refractive media. Kasan, 1885. A continuation of the work begun in 1881.

223. Durègne. De l' éclairage électrique considéré au point de vue d'hygiène. *Rev. sanitaire de Bordeaux*, No. 30, 1885, p. 43. Recommends the electric light for large rooms containing many people, though it should be so arranged that the light does not directly strike the eye.

224. Fielitz-Wittholz. Fielitz's reading-machine. *Klin. Monatsbl. f. Augenhk.*, May, 1885.

225. Jacobson. The merits of Albrecht von Graefe in modern ophthalmogy exhibited from his works. Berlin, 1885, pp. 374.

226. Schweigger. Text-book of ophthalmology. Berlin,

1885. Fifth edition. The first edition appeared in 1871, so that a new edition had to be published about once every three years.

227. STEFFAN. To what extent do our present methods of teaching during the first three years of school life, *i. e.*, the 7th, 8th, and 9th year, comply with the demands of the hygiene of the eye? *Centralbl. f. allg. Gesundheitspflege*. Bonn, 1885.

The object of FIELITZ'S (224) reading-machine is to do away with the primers for the first instruction in reading. It consists of a frame about the size of an ordinary blackboard, on which movable letters can be arranged in any order desired. As the children can sit upright during instruction, the introduction of the machine is of the greatest importance. The eyes are not fatigued, the illumination is good, and the pedagogic advantages of the machine are not slight. The apparatus, therefore, deserves the attention of ophthalmologists and teachers.

JACOBSON (225) presents an excellent review of Graefe's scientific productions. The book is so arranged as to give in a brief but concise manner the essence of all the larger and smaller papers of Graefe. The reviews are systematically arranged in accordance with the subject, so that the reader can rapidly gain an insight into the whole of Graefe's literary activity. The book is of great importance both for the study of Graefe and for reference in daily practice. Jacobson deserves great thanks for this laborious undertaking.

STEFFAN (227) makes the following demands: (1) abolition of the German type; (2) removal of all lines from the slate and writing-book except one; (3) abolition of the slate and pencil; either a white slate or paper and lead pencil, where ink is not used; (4) instruction first in reading, then in writing, with the aid of blackboards, instead of first in writing and then in reading, as at present; (5) instruction in writing should not go so far as to make expert penmen of the children; a neat, legible handwriting is sufficient; (6) the children should not be sent to school before the end of the 7th year; (7) abolition at the Kindergarten of all work requiring close vision, of network drawing, mat-plaiting, stitching perforated plane figures and perforating.

b—STATISTICAL PAPERS.

228. BROOKLYN. Sixteenth annual report of the Brooklyn Eye and Ear Hospital for 1884.

229. DOR. Rapport annuel de la clinique ophthalmologique à Lyon, 1884.

230. DÜRR. Ophthalmological review for 1881 to 1884, and a brief report on the Institution for the Blind, at Hanover, with a summary of the causes of blindness of the present inmates. Hanover, 1885.

231. DE HAAS. Annual report of the ophthalmic clinic at Rotterdam, for the year 1884. 3,982 patients; 242 operations, among them 57 cataract-extractions.

232. HIRSCHBERG. Fifteenth annual report for 1884, of Prof. Hirschberg's ophthalmic clinic. 7,625 new patients; 389 operations, among them 76 cataract-extractions.

233. MAGNUS. First report of the ophthalmic clinic of Prof. Magnus. Breslau, 1885.

234. SAMELSOHN. Tenth annual report of the Cologne ophthalmic clinic for 1884. 3,888 patients; 501 operations, among them 55 extractions of cataract.

235. SCHIESS-GEMUSEUS. Basel Ophthalmic Institute. 21st annual report for 1884. Basel, 1885.

At the Brooklyn Eye and Ear Hospital (228), 3,375 patients were treated in 1884,—32,131 in 15 years; 583 operations—in 15 years, 6,051. In 1884, 19 extractions were performed; in 15 years, 130. Physicians: Mathewson, Prout, Rushmore.

DOR (229) treated 1,608 new patients in 1884. 30 extractions of cataract; 30 with good, 1 with moderate result. Artificial ripening, according to Förster, was performed in 9 cases, 8 with, 1 without result; no injurious consequences were observed.

DÜRR (230) treated 8,167 patients, from 1881 to 1884. The affections of the conjunctiva and cornea together make up far more than half of all diseases treated. Glaucoma with 0.56 % is, in Hanover, one of the rarest affections; neither do diseases of the uveal tract occur very often. 471 operations were performed, among them 100 uncomplicated senile cataracts, according to v. Graefe's method.

The following tables show the causes of blindness of the 119 inmates of the asylum for the blind, at Hanover:

Congenital blindness 40 = 33.6 %.

Microphthalmus and anophthalmus	6	Congenital choroiditis	1
Megalophthalmus	9	Congenital atrophy of optic nerve	9
Congenital cataract	8	Retinitis pigmentosa	7

Idiopathic affections of the eyes 29 = 24.3 %.

Blennorrhœa neonatorum,	19	Cataract	1
Diphtheritic conjunctivitis,	2	Atrophy of optic nerve .	1
Affections of the cornea .	3	Glaucoma	1
Choroiditis	1	Myopia	1

Constitutional affections 25 = 21 %.

Cerebral affections . .	9	Measles	4
Typhoid fever . . .	1	Morbus maculosus . .	1
Scarlet fever . . .	2	Scrofula	8

Injuries 15 = 12.7 %.

Injuries of the eyes . .	2	Operations	2
Injuries of the head . .	5	Sympathetic ophthalmia .	6

Unknown causes 10 = 8.4 %.

MAGNUS (233) treated 2,275 new patients, and performed 177 more important operations, among them 30 extractions according to v. Graefe. In 478 cases, *i, e.*, 21 %, the cause of the affection of the eye could be traced to a constitutional disease, as the following table shows :

	PER CENT.		PER CENT.
Scrofula . . .	16.79	Gravidity and puerperal state	0.21
Measles . . .	1.32	Diphtheria . . .	0.13
Syphilis . . .	0.61	Hysteria . . .	0.13
Brain	0.52	Scarlet fever . .	0.08
Tabes	0.39	Typhoid fever . .	0.04
Albuminuria . .	0.21	Erysipelas of the face	0.04
Anæmia . . .	0.21	Morbus Basedowii .	0.04
Tuberculosis . .	0.21		

SCHIESS-GEMUSEUS (235) treated 1,779 patients, and performed 179 operations. He made 40 extractions of uncomplicated senile cataract, 37 with good result, 3 failures.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

a.—GENERAL PATHOLOGY AND DIAGNOSIS.

236. CHIBRET. De l'infection de l'œil, ses causes, son traitement. *Arch. d'ophth.*, vol. v., 3, May and June, 1885.

237. CHIBRET. Transplantation de l'œil du lapin à l'homme. *Rev. gén. d'ophth.*, vol. iv., 5.

238. VON GUDDEN. On neuroparalytic inflammation. *Arch. f. Psych.*, vol. xvi., 2, Berlin, 1885, p. 572.

239. HÖLTZKE. Experimental investigations on intra-ocular pressure. *Verhandl. d. Berl. physiol. Gesellsch.* Sitzung vom 15 Mai, 1885. *Arch. f. Anat. u. Physiol.*, physiol. Abth., Nos. 3 and 4, p. 350.

240. VOSSIUS. Microchemical investigations into the origin of the pigment in the melanotic tumors of the eye. *Arch. f. Ophth.*, vol. xxxi., 2.

CHIBRET (236) remarks that, in the infection of wounds of the eye, the power of resistance of the organism against the infectious germs probably plays an important part. The attempt should therefore be made to make the body more resistant against those organisms which may have escaped the action of the antiseptic substances used. When, however, infection does take place after extraction, it can generally be traced to a latent affection of the nose or the lachrymal apparatus. When suppuration has begun, Chibret recommends, besides treatment of the original affection, injection of a solution of sublimate, 1 : 2,000, into the parenchyma of the cornea after previously instilling cocaine. The canula of an irrigating apparatus is held close to the wound, until the entrance of the liquid into the cornea becomes perceptible by the opacity produced. The procedure is also recommended for other suppurative processes of the cornea.

v. MITTELSTÄDT.

After several unsuccessful attempts on animals, CHIBRET (237) transplanted the eye of a rabbit, under antiseptic precautions, into Tenon's capsule, of a girl of 17, whose staphylomatous eye had been enucleated. The (human) conjunctiva, drawn over the cornea like a pouch by a suture, kept the eye in position. On the 2d day the cornea was dull, the eye still in position, and movable by the muscles. On the 5th day the patient had ciliary pains; the cornea was still insensible. The suture was removed, as it had depressed the cornea at two points. The eye was very soft. About on the 10th day the cornea seemed to clear up, and the tension to be increased. On the 10th day the cornea was sensitive to touch, even more than the healthy one. Soon sloughing of the cornea began, so that on the 15th day the iris lay partly bare. The patient had no pain, neither were the remnants of cornea sensitive. Here the report ends for the present. Chibret hopes that by repeated experiments he will find an eye better adapted for transplantation, and intends to improve the method, especially in regard to the application of the sutures. Chibret

believes that in much shorter time than one might think "la question de la restitution de la vue pourra se poser" (!! Rev.).

v. MITTELSTÄDT.

GUDDEN (238) shows that the destruction of the cornea, after division of the fifth nerve, is only due to external causes. The following experiments prove this: (1) In new-born rabbits the optic nerve and ciliary nerves were divided within the orbit. Although the whole cornea was insensible, it remained clear. The palpebral nerves were not cut, so that the lids protected the cornea. (2) In new-born rabbits the palpebral branches of the fifth and third nerves were divided, besides the optic nerve and ciliary branches. Cornea insensible. In this case protection was afforded by the ptosis of the lids and the immovable palpebra tertia. (3) In full-grown rabbits the ganglion cervicale supremum was extirpated on one side. It was followed at once by contraction of the pupils (a symptom of irritation), and, on the second day, by dilatation. After removal of the ganglion the upper lid sinks a little, and this ptosis was increased when afterwards the fifth nerve was divided. Here, too, the cornea was preserved for a time by some protection afforded. (4) In full-grown rabbits the fifth nerve was divided. In a short time the whole cornea became dull when the animals were not well taken care of; the inflammation subsided when the eye was carefully cleaned. (5) In a full-grown rabbit the fifth nerve was divided. The animal was well taken care of; it was placed in a box with smooth sides and a carpet. The cornea remained perfectly clear. When the cornea is deprived of all protecting contrivances, but the fifth nerve is preserved, another means of protection comes into play: the retractor bulbi draws the eye far back into the orbit. Other experiments, whether a cornea deprived of the fibres of the fifth nerve was more vulnerable than a normal one, did not indicate any difference.

HÖLTZKE (239) found (1) that eserine at first markedly increases the pressure in the anterior chamber, but that afterwards the myosis produced not only neutralizes this increase, but even diminishes the pressure in the anterior chamber below the physiological mean; (2) atropine certainly does not directly increase the pressure, but increases the pressure in the anterior chamber to a marked degree by its power of dilating the pupil; (3) in an eye not poisoned the pressure in the anterior chamber rises when the pupil dilates and sinks when it contracts; (4) pilocarpine at

first increases the pressure in the anterior chamber, though to a much less extent than atropine ; (5) there is no material difference between the pressure in the anterior chamber and vitreous.

Vossius (240) shows that a large portion of the pigment, from which the melanotic sarcomata of the eye derive their color, is derived from the hæmoglobine of the red blood corpuscles. The theory of Fuchs is therefore not tenable, according to whom the pigment of all melanosarcomata of the uveal tract is autochthonous and due to the metabolic action of the cells.

b.—GENERAL THERAPEUTICS.

241. Fano. Quelle est la region du corps le plus favorable pour pratiquer une emission sanguine dans le but de dégorger les vaisseaux de la choroide ? *Jour. de méd. et de chir.*, 1885. The nasal angle of the orbit he claims to be the best for relieving the choroid of blood. Leeches should be applied along the frontal and angular veins.

242. Green, John. On operations for partial or total removal of the globe. *Amer. Jour. Ophth.*, March, April, 1885.

243. Panas. Antiseptics in ophthalmology. Paris, 1885, Masson.

Green (242) presents an historical review of the literature of the subject from the time of Wardrop, with special regard for the method lately recommended of evisceration of the contents of the globe. He discusses under what conditions one operation has advantages over the others. He thinks that exenteration can be as easily performed as enucleation, and that it affords equally sure protection against sympathetic ophthalmia, while, at the same time, the danger of meningitis is less. Burnett.

Panas (243) recommends sublimate, 1–10,000, or biniodide of mercury, 1–25,000. He had healing by first intention (see text) in all of the 260 operations in which he used the remedies.

III.—INSTRUMENTS AND REMEDIES.

a.—INSTRUMENTS AND TECHNICAL CONTRIVANCES.

244. Dennett. An electric ophthalmoscope. *N. Y. Med. Record*, May 2, 1885.

245. Exner. A micro-refractometer. *Arch. f. microsc. Anat.*, vol. xxv., p. 97.

246. Jackson, E. Determination of refraction by retinoscopy.

Med. Science, April, 1885. Recommends plane instead of concave mirrors.

247. IMBERT. Nouveau procédé de vérification des verres cylindriques. *Ann. d'ocul.*, vol. xciii.

248. MOTAIS. Pince-nez pour verres cylindriques. *Ann. d' ocul.*, vol. xciii., p. 248. *Rev. gén. d'ophth.*, vol. iv., June 6, 1885.

The electric light of ¾ candle-power is concealed in the handle of DENNETT'S (244) ophthalmoscope and is thrown by a condensing lens on the mirror, which is inclined at an angle of 45°. A few elements of any constant battery are sufficient. A pocket-battery can be used for the purpose. The instrument is made by Meyrowitz Bros., New York. BURNETT.

In order to prevent the turning of the frame of the pince-nez containing cylindrical glasses, whereby a false position of the axes is produced, MOTAIS (248) had constructed by the optician, Dreux of Angers, a pince-nez which differs from the ordinary one in the construction of the spring. The frame of the glasses does not describe an arc when it is opened, but moves horizontally on two sliding bars ; a spring attached to the bars approaches the glasses in a horizontal direction.

IV.—ANATOMY.

a.—GENERAL ANATOMY.

249. MILES STANDISH. Celloidin, the new substance for embedding specimens ; how to use it, and its advantages. *Amer. Journ. Ophth.*, March, April, 1885.

250. REAL Y BEIRO. À l'étude de l'embryologie de l'œil. § 1. Du developpement du corps vitré et de la capsule vascularisé du cristallin. *Rec. d'ophth.*, 4, série, No. 6, June, 1885.

REAL Y BEIRO (250) comes to very different conclusions from those generally accepted as to the participation of the mesoderma in the development of the vitreous as the result of his studies on mammals and birds. According to him it is the network of blood-vessels surrounding the primary ocular vesicle which belongs to the pia mater and afterwards becomes the chorio capillaris, which enters into the interior when the secondary ocular vesicle is formed, anteriorly by the pressure upon it of the developing lens, posteriorly by an independent entrance into the fœtal cleft. This network of blood-vessels alone is the origin of the vitreous ; the cells of the mesoderma, when they are found, do not take part in

the development of the vitreous. In birds this network of blood-vessels produces a gelatinous hyaline substance which fills the whole interior and forms the embryonic vitreous. White blood corpuscles were the only cellular elements found in it.

V. MITTELSTÄDT.

b.—CORNEA, CONJUNCTIVA, AND MUSCLES.

251. EICHBAUM. Investigations on the aponeuroses of the globe and the ocular muscles in the domestic mammals. *Zeitschr. f. vergleich. Augenhk.*, vol. iii., Leipzig, 1885.

252. LUNKEWITSCH. The microscopic anatomy of the conjunctiva. Charkow, 1885.

253. STÖBER. The structure of the conjunctiva of the lids. *Physikalisch-medicinische Gesellschaft zu Würzburg.*

EICHBAUM (254) describes Tenon's capsule in the domestic mammals as follows: It is an aponeurosis which begins at the corneal margin where it is united to the conjunctiva, extends over the anterior surface of the sclera, lying directly upon it and joined to it by a little connective tissue, then passes to the retractor bulbi, becoming thinner and thinner as it extends back along this muscle, and finally sends processes into fissures lying on the medial and lateral sides of the muscle, in shape of duplicatures of its inner lamellæ which surround the optic nerve. The *mm.* recti and obliqui pass through the aponeurosis, whose outer surface is firmly united with the fascia profunda in the neighborhood of the globe.

LUNKEWITSCH (252) has examined the various components of the conjunctiva, considers the contradictory views of different authors, confirms the statements of some, and comes to conclusions of his own in some questions. The stroma differs more at different ages than in different animals of the same age. It also varies materially at differents points of the same species. The author found true papillæ in the anterior and almost the whole middle third of the conjunctiva tarsi; none in the conjunctiva of the fornix of young persons, but in the conjunctiva of the globe of dogs. The infiltration with lymph of the conjunctiva tarsi begins close to the openings of Meibom's glands. The author believes that in full-grown animals follicles occur normally, but in man are pathological. The apparent tubular glands (in the conjunctiva of animals) he thinks are only depressions in the furrows. The author found acinous glands in man in the posterior third of the conjunc-

tiva tarsi as far as the fornix, in the lateral portion, above and below. He never saw convoluted glands at the outer margin of the cornea. The system of capillaries forms a net which everywhere is spread parallel to the stroma, except in the papillary portion, where it rises into the plane of the papillæ, two or three capillaries surrounding a papilla and passing at its apex into a vein. In regard to the nerves of the conjunctiva and their terminations he confirms the existence of the varions forms—Krause's terminal bulbs—all of which lie beneath the net of capillaries. The greatest number of terminal bulbs is found in the fornix ; less in the conjunctiva of the globe. The author also found them in the posterior portion of the conjunctiva of the tarsus. Lunkewitsch could not distinguish more than two sheaths around the terminal bulbs. In man he found them round or roundish and smaller, their number greater. The axis-cylinders could be traced (by the gold method after previously fixing it with bichromate of ammonia) into the middle epithelial layers. The author did not see the triangular bodies of Ciaccio. According to Lunkewitsch the nerves are distributed as follows through the conjunctiva : The branches of the fifth nerve form a net with wide meshes consisting of bundles of thin medullated fibres. Some of these fibres detach themselves from the net and end in Krause's bulbs. Others subdivide into primary fibres, which pass along the superficial layers of the stroma, lose their medulla, and divide once more into extremely thin fibres, the smaller portion of which penetrates into the epithelium, ending in little nodosities, while the larger takes part in the formation of a sub-epithelial net lying beside or over the net of capillaries. The pale nerve fibres of the sympathetic system, which accompany the blood-vessels, seem also to take part in the formation of the subepithelial network of nerves.

HIRSCHMANN.

c.—UVEAL TRACT, RETINA, AND OPTIC NERVE.

254. FONTAN. Contribution à l'histologie de la choroide. *Rec. d'ophth.*, June, 1885.

255. HUNICKE. A case of anomalous central retinal blood-vessels. *Amer. Jour. Ophth.*, Feb., 1885. The lower temporal vein forms a recurrent branch, instead of spreading out over the retina.

256. KÖLLIKER. On opaque nerve-fibres of the retina. *Inaug. Diss.*, Zürich, 1885.

KÖLLIKER (256) found among 52,180 patients 59 with opaque nerve-fibres—*i. e.*, 0.11 %. They generally occur in only one eye; in both they are found in 13.7 %. In 31.34 % they were observed extending upward, as often downward; in 25 % on the right side (inward?—TRANSL.); and in 11 % outward. They never reached the macula lutea, but sometimes passed around it. Of the whole number 62 % were men, 38 % women; in 15.2 % there was strabismus, divergent occurring about three times as often as convergent strabismus. In 47.9 % there was myopia, in 31.3 % hypermatropia, and in 20.8 % emmetropia. No functional anomalies were observed, with the exception of the local scotomata.

d.—CENTRAL ORGAN.

257. RICHTER. The paths of optic conduction in the human brain. *Arch. f. Psych.*, vol. xvi., 2, p. 561.

RICHTER (257) made a post-mortem examination of three cases of atrophy of the optic nerve of only one eye, and six of atrophy of the nerve of both eyes. He obtained the following results: Monocular or binocular atrophy of the optic nerve, affecting the brain of an adult, need not be visible to the naked eye beyond the optic tract, even after the lapse of ten years. 2. Within this time the atrophy affects in the same manner the ganglia of the corpora geniculata, the upper and lower corpora quadrigemina, and the thalami optici; atrophy of the optic nerve of only one eye affects the just-mentioned parts of the brain on both sides; in binocular atrophy the effect is cumulative. 3. Degeneration of the occipital lobe does not affect these parts even after many years, as far as such changes are visible to the naked eye. 4. It has not yet been proven that degeneration of the occipital lobe affects the ganglion-cells of the parts of the brain named above.

V.—PHYSIOLOGY.

a.—GENERAL PHYSIOLOGY.

258. BORGELLINI. Sulle simpatie che esistono fra occhio e l'orrechio. *Boll. d'ocul.*, vol. vii., 8 and 9.

259. CARTER. Acuteness of vision. *Med. Times*, No. 18, 14.

260. DEEREN. Contribution à l'étude du siège des images entoptiques. *Rec. d'ophth.*, May, 1885.

261. LEROY. De la perception monoculaire des grandeurs ou des formes apparentes. *Arch. d'ophth.*, vol. v., 3, p. 216.

262. SCHICK. Experimental contributions to the knowledge of the laws regulating the exchange of liquids in the eye, with special regard to the regeneration of the aqueous humor. *Arch. f. Ophth.*, vol. xxxi., 2.

SCHICK (262) comes to the following conclusions: The solution of ferrocyanide of potassium injected subcutaneously in rabbits appears in the blood-vessels of the eye a few minutes later. 2. No current of filtration can be shown to exist, such as Ulrich has described as emanating from the choroid and passing through the retina, vitreous, zonula zinnii. posterior chamber, iris and anterior chamber into the cornea. 3. The solution of the salt passes from the ciliary body and iris into the posterior chamber. 4. From the posterior chamber the liquid penetrates the capsule of the lens and through Petit's canal into the lens substance. 5. The salt passes through the zonula into the vitreous, enters its anterior layers and then spreads through the whole vitreous. 6. He could not determine whether the salt entered the retina from its own blood-vessels or those of the choroid; the former supposition is more probable. 7. In the healthy eye no communication can be shown to exist between the anterior and posterior chamber at the pupillary margin. 8. The aqueous humor of the anterior chamber is furnished by the whole anterior surface of the iris; it probably comes from the blood-vessels of the iris, at least by far the greater portion. 9. The aqueous humor of the anterior chamber is carried off through Fontana's spaces. 10. The salt does not enter the cornea by direct filtration from the anterior chamber, but from the looped blood-vessels at the corneal margin. 11. When injected directly into the vitreous and under increased pressure in the latter, the salt enters the choroid through the retina and is absorbed by the blood-vessels of the former. 12. After injection into the vitreous the salt passes through the zonula into the posterior chamber; here part of it enters the lens at its equator, while another part enters the ciliary body and posterior surface of the iris, where it is absorbed by the blood-vessels of the latter. 13. A part of the liquid which had entered the iris passes out at the anterior surface of the latter into the anterior chamber. 14. The salt, when injected into the vitreous, does not enter the cornea from its posterior surface. 15. A solution of uranine injected subcutaneously into a rabbit appears soon afterwards in the blood-vessels of the eye, passes through their walls, and penetrates into all parts of

the eye through predetermined channels. 16. From the choroidal blood-vessels the uranine penetrates the whole thickness of the choroid. 17. There is no current of liquid passing from the choroid through the retina into the vitreous. 18. The retina is nourished from its own blood-vessels and not those of the choroid. 19. From the surface of the ciliary body the uranine penetrates into the posterior chamber. 20. From the posterior chamber the uranine filters through the zonula into the vitreous, coloring first the anterior and then the posterior layers. The coloration of the vitreous is independent of that of the retina and choroid. 21. A portion of the least of the uranine passes out of the eye by the same paths by which it entered. 22. From the posterior chamber the green liquid enters the capsule of the lens at the equator, and then the lens itself. It colors first the cortex and then the nucleus, and leaves the lens in the same way. 23. The nutritive changes of the vitreous and lens take place much more slowly than those of the other parts of the eye. 24. In the healthy eye there is no communication between the two chambers at the pupillary margin, the regeneration of the aqueous humor taking place entirely from the anterior surface of the iris. 25. The liquid coming from the iris does not filter in a fixed zone of filtration from the posterior chamber through the tissue of the iris into the anterior chamber, but comes principally from the blood-vessels of the iris. 26. The first greenish tinge always comes from the sphincter of the iris. 27. The coloring-matter does not penetrate from the anterior chamber through the epithelium into the cornea, the coloration of the cornea always taking place from the sclero-corneal margin.

b.—IRIS, ACCOMMODATION, MUSCLES, REFRACTIVE MEDIA.

263. BELLJAMIN. Application of a graphic method to the study of the movements of the pupil. *Russkaya medicina*, Nos. 11–13.

264. BARRETT. The velocity of accommodation. *Journal of Physiology*, vol. vi., p. 46.

265. MATTHIESSEN. On the law of the increase of the indices of refraction within the lens of mammals and fishes. *Arch. f. Ophth.*, vol. xxxi., 2.

Dr. BELLJAMIN (263) has had recourse to photography, and especially the very sensitive bromide-of-silver paper used in the instantaneous process, for recording graphically the movements of

the pupil in physiological experiments. He has constructed an apparatus, the photocoreograph, analogous to the photohematochometer of Dr. Zybulsky. An image of the eye under examination is formed by the object-glass, and falls through a vertical slit in shape of a vertical streak upon the sensitive paper, which is fastened upon a rotating cylinder in the focus of the object-glass. The image of the iris and sclera appears as a dark streak, the black pupil as a bright one. The rapidity with which the paper moves is known and can be regulated; when a physiological experiment (irritation) is being conducted, a little lever records on the paper the moment of opening and closing the galvanic current. For the particulars of construction of the apparatus, see the original. A few photograms are added. The author intends to publish a more extensive paper on experiments conducted with the apparatus. HIRSCHMANN.

c.—PERCEPTION OF COLOR.

266. HERING. Some individual differences of the color-sense. *Lotos*, new series, vol. vi.

267. HILBERT. The behavior of the color-blind in regard to abnormal dispersion. *Klin. Monatsbl. f. Augenhk.*, May, 1885.

268. HILBERT. The subjective colors and Hering's theory of colors. *Betz's Memorabilien*, 1885, No. 2.

HERING (266) in polemics against Donders comes to the following conclusion: The red-green blind form a class by themselves, and are distinguished from those with normal eyes for color by the complete absence of the perception of red and green. We find, however, in the color-blind the same differences of the color-sense as in persons with normal eyes, with the distinction, however, that in the former only the perceptions of black and white and blue and yellow can be thus affected; in the latter the perception of red and green also.

VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

Chapters VI.–XI. by DR. HORSTMANN.

269. HERMANN, TH. Contribution to the knowledge of the refractive conditions of infants and children during the first years of life. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 2, p. 122.

270. STILLING, J. A study of the question of myopia. *Arch. f. Augenhk.*, vol. xv., p. 133.

271. SEELY, W. W. Further studies on the development of myopia. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxiii., p. 278.

272. FUCHS, E. Disturbance of vision due to anisometropia. *Arch. f. Augenhk..*, vol. xv., p. 1.

HERMANN (269) has examined the refraction of 110 children not above the age of 3 months, and found that the human eye at this time of life is hypermetropic without exception. Among 66 children between the ages of 1½ and 10 years, who had not been regularly occupied and had not gone to school, he found 119 hypermetropic, 9 emmetropic, and 4 myopic eyes; it was also shown that the refraction increased with advancing age.

STILLING (270) concludes, after an examination of 2,539 scholars of the higher classes, that myopia is of frequent occurrence, but not so frequent as is generally maintained by Cohn's followers. The reason he finds in the uncertainty of the statistical determinations of refraction. The genuine myopia of 3–5 D due to close-work exists in only 5 % of all school-children.

SEELY (271) thinks that convergence is an essential factor in the development and increase of myopia.

FUCHS (272) reports on two patients who were emmetropic in one eye and slightly myopic in the other, and who complained of visual disturbances when reading at a certain distance.

VII.—LIDS.

273. FUCHS, E. Congenital abnormal shortness of the lids. *Arch. f. Augenhk.*, vol. xv., p. 2.

274. FUCHS, E. Cure of a large angioma of the face and lids by electro-puncture. *Soc. méd. chir. de Liège*, Feb., 1885.

275. HIRSCHBERG, J. Another case of vaccine-blepharitis.

276. STREATFEILD. Ectropium. *Trans. Ophth. Soc. Unit. Kingd.*, 1884, vol. iv., p. 15.

277. WARLOMONT. De l'emploi du cautère actuel et du thermo-cautère dans le traitement de l'entropion et du trichiasis. *Ann. d'ocul.*, vol. xciv., p. 5.

278. BADAL. Blepharoplastie. *Gaz. hebd. des sciences méd. de Bordeaux*, 1885, No. 11, p. 109.

279. CAUDRON. Contribution à l'étude du ptosis congénital. *Rev. génér. d'ophth.*, vol. iv., 6, p. 241.

FUCHS (273) reports three cases of abnormal shortness of the lids, so that the patients could close them only by strong pressure.

He found in every case a diminution in height. The condition was always congenital. The only successful treatment consists in tarsoraphy, which was performed in one case with good result.

FUCHS (274) removed a large growing angioma in a girl eight years old, by electro-puncture, in twenty-nine sittings. It occupied half of the left cheek, the whole lower and one third of the upper lid. Six months later only slight swelling and discoloration of the lower lid remained.

HIRSCHBERG (275) saw swelling of the upper lid develop in a woman thirty years old, after contact of the left eye with vaccine. There was a whitish infiltration of the edge of the lid, and several vesicular, but not prominent, infiltrations were observed on the skin of the lower lid. There was moderate chemosis besides, but no secretion. The affection disappeared in the course of ten days after applications of chlorine water.

STREATFEILD (276) reports two cases of extreme ectropion, the first treated by a large piece of skin transplanted from the arm, without a pedicle, the second by the V operation. FITZGERALD.

After a short review of the methods of operating for ptosis in use at the present time, CAUDRON (279) describes the procedure of E. Meyer, the results of which were excellent in the three cases reported. Meyer makes an incision through the skin along the edge throughout its whole length, and at the ends two cuts perpendicular to it, which pass beyond the terminations of the eyebrows. He then dissects the flap thus indicated from the subjacent tissue beyond the superciliary muscle, and tilts it back upon the brow. He then applies three cat-gut sutures 1 *cm.* apart, which pass from above downward, include the superciliary and orbicularis muscle, cross the tarsus, and are tied at the palpebral margin, the lid being pushed upward at the same time. The threads are then cut off short, and the flap is returned to its original position, and fastened with a few sutures. v. MITTELSTÄDT.

VIII.—LACHRYMAL APPARATUS.

280. HANSEN-GRUT, E. Blennorrhœa sacci lacrymalis and dacryocystitis acuta. *Hospitalstid*, Nos. 20 and 21, Copenhagen, 1885.

281. TARTUFERI. The treatment of strictures of the lachrymal canal. *Centralb. f. prakt. Augenhk.*, 1885, p. 143.

282. LEPLAT. Note sur les concretions des voies lacrymales. *Ann. de la soc. méd.-chir. de Liège*, 1885.

HANSEN-GRUT (280) calls attention to the fact that repeated attacks of nasal catarrh are in most cases the cause of dacryocystoblennorrhœa. Strictures are much oftener the result than the cause of blennorrhœa. Acute dacryocystitis again is the consequence of chronic blennorrhœa. The treatment of the latter must, therefore, be begun as soon as possible, in order to prevent evil consequences. The disease can be cured entirely, and when this is not the case, the danger of secondary affections can at least be much diminished. First of all the blennorrhœa must be treated before dacryocystitis has developed. The best results are obtained by slitting the upper canaliculus, and introducing Bowman probes of medium size. SCHJÖTZ.

In cases of chronic dacryocystitis, with constriction of the lachrymal canal, TARTUFERI (281) has hitherto scraped out broad flaps of the mucous membrane and the tissue composing the stricture with an olive-shaped file. The manufacture of the instrument, however, being difficult, he now uses a raspatory resembling Daviel's spoon. It has the shape of half an olive, is 15 *mm.* long and 3 *mm.* wide, with sharp edges and a small guiding olive-point. The scraping is not attended by pain after cocaine has previously been injected into the lachrymal canal.

LEPLAT (281) examined in two cases concrements which filled the tear passages. They were small, grayish masses, the size of a pea, soft and friable. They proved to be streptothrix Försteri.

IX.—MUSCLES AND NERVES.

283. STEINHEIM. Nuclear paralysis of the abducent nerve and polyuria. *Deutsche med. Wochenschr.*, 1885, No. 30.

284. WEISS. A case of periodic total left-sided paralysis of the oculomotor nerve. *Wiener med. Wochenschr.*, 1885, No. 17.

285. SNELL, S. Recurrent paralysis of the third nerve, with attacks of migraine. *The Lancet*, 1885, vol. i., No. 21. Clinical history.

286. TRIVUS, S. L. Salicylate of sodium against neuralgia of the orbital branch of the fifth nerve. *Wratsch*, 1885, No. 24.

WEISS (284) found, at the origin of the left oculomotor nerve, where it leaves the pedunculi cerebri, gray granulations the size of a poppy seed, containing a mass of tubercle-bacilli, in a woman who had died of tuberculosis, and who, since childhood, had suffered at times from total paresis of the oculomotor nerve. Weiss thinks that repeated eruptions of tubercular masses produced the

attacks of paresis, which disappeared when the remaining fibres of the oculomotor nerve resumed their functions.

TRIVUS (286) observed rapid relief and recovery in typical cases of neuralgia of the orbital branch of the fifth nerve from salicylate of sodium, 10–20 grms. every hour during the paroxysm, until the pain disappeared. HIRSCHMANN.

X.—ORBIT AND NEIGHBORING CAVITIES.

287. PANAS. De la ténonite ou inflammation de la bourse cellulaire rétro-oculaire. *Union méd.*, 1885, No. 37, p. 433. Nothing new.

288. PFALZ, G. Contribution to the pathological anatomy of cysts of the orbit. *Zeh. klin. Monatsbl. f. Augenheilk.*, vol. xxiii., p. 271.

289. MARÉCHAL. Tumeur cystique volumineuse de l'orbite paraissant substitutée la glande lachrymale. *Rev. clin. d'ocul.*, 1885, No. 3, p. 82.

290. PANAS. Exostose du sinus frontal. *Congrès franç. de chir.*, 1885.

291. KUNACHOWITSCH. Case of orbital tumor. Myxoma of the optic nerve. *Med. Obosrenisse*, 1885, No. 16.

292. SATTLER, ROBERT. Case of unilateral transient exophthalmus without disturbance of function and movement of the eyes, coexistent with enophthalmus or sinking back of the eyeball. *Amer. Jour. of Med. Sci.*, April, 1885.

293. SATTLER, ROBERT. Pulsating exophthalmus; elastic tumor of the common carotid, due to an injury of the skull; ligation of the left common carotid. *Med. Rec.*, June 13, 1885.

294. HUTCHINSON, J. Proptosis. *Trans. Ophth. Soc. Unit. Kingd.*, 1884, vol. iv., No. 36.

295. PEDRONO. Des lésions oculaires dans le goître exophthalmique. *Thèse de Paris*, 1885.

PFALZ (288) found that the wall of an orbital cyst, containing a dark, brownish-red liquid, consisted of an epithelial layer of connective tissue, a vascular layer, and the real stroma, fibrillar and vascular connective tissue and fatty tissue, into which the preceding layer gradually merged.

KUNACHOWITSCH (291) reports the following case: Girl, eighteen years old. The tumor began to develop ten years ago. V was lost three years ago. The globe was pushed forward and

movable in all directions ; there had never been any pain. The tumor was removed with the eyeball ; it weighed six ounces. Dr. Ljubimow examined it and pronounced it a fibro-cellular cystic and hemorrhagic myxoma. The tumor was extraocular and had developed from the optic nerve, 2–3 *mm.* behind the globe.

HIRSCHMANN.

PANAS (290) reports a case of exostosis of the frontal sinus. During the operation, he came upon a cavity which, he thought, was a remnant of the frontal sinus. Death five days after the operation. The autopsy showed that the cavity in question was the cranial cavity. MARCKWORT.

SATTLER (292) discusses a case of unilateral transient exophthalmus without disturbance of function or mobility of the eye coexistent with enophthalmus or sinking back of the globe. The patient with this rare affection was a man, forty-six years old, who came to be examined on account of presbyopia. V in both eyes = $\frac{20}{20}$. When sitting there was marked enophthalmus of the left eye. The tension was much less on this side than on the other. Rapid walking or movements with the arms caused the eye to protrude. Inclining the head forward for a few seconds or pressure on the corresponding side of the neck had the same effect. When the patient throws the head back, the exophthalmus slowly increases, until, after the lapse of 15 seconds, the highest degree is reached, first directly forward, then forward and outward. The utmost limit is 28 *mm.* There is no diplopia, until 18 *mm.* have been reached. The condition had existed for 25 years. The fundus is normal. BURNETT.

After a few general remarks on pulsating exophthalmus and reference to the literature of the subject, SATTLER (293) reports in detail the clinical history of a case. The patient, a coal-heaver, eighteen years old, suffered compression of the head between two loaded wagons. He lost consciousness and bled from the nose and ears. The immediate consequences were impairment of vision, dizziness, diplopia, and deafness. Five weeks after the accident he noticed humming noises in the head. This was followed by pulsating sensations in the orbit. An examination revealed the following conditions : The whole left palpebral region bulged and was covered with dilated veins. By placing the fingers on it a whirring and a glove-like swelling at the inner upper margin of the orbit, can be plainly felt. V = $\frac{20}{20}$. The papilla and its immediate surroundings were dull and swollen.

Complete paralysis of the abducent nerve of both eyes. On compression of the carotid pulsation ceases, the exophthalmus is reduced, and the noise diminished which is heard by auscultation of the temporal, frontal, and parietal region. Digital and instrumental compression of the carotid was tried, but could not be carried through ; finally, the left common carotid was tied above the omohyoid muscle. Although the operation was not entirely successful, the patient could again go to work. V improved to 0.9.

BURNETT.

HUTCHINSON (294) reports the case of a Hindoo barrister whose right eye had been lost by inflammation after an operation for the removal of an orbital tumor, and whose left eye, at the time H. saw him, was thought by the patient to be in the same condition as the right one at the time of the operation. There was extreme proptosis, the lower lid was everted, and the whole of its mucous membrane exposed. The movements of the eye were not much interfered with, but there was much conjunctival congestion and chemosis. The lachrymal, parotid, and lymphatic glands on both sides of the neck were enlarged. Under the application of ice with the exhibition of iodide of potassium and small doses of mercury internally, the eyeball had receded almost to its natural position at the time of the patient's departure for India.

FITZGERALD.

XI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

296. CHIBRET. De l'infection de l'œil, ses causes, son traitement. *Rev. génér. d'ophth.*, vol. iv., 5, p. 193.

297. UPPENKAMP, H. The etiology and prophylactics of ophthalmo-blennorrhœa neonatorum. Inaug. Diss., Berlin, 1885.

298. OPPENHEIMER, O. Investigations on the gonococcus (Neisser). *Arch. f. Gynæk.*, vol. xxv., 1.

299. KREISS. Contributions to the knowledge of the gonococci. *Wiener med. Wochenschr.*, 1885, Nos. 30 and 31.

300. MEMOSKY. Ophthalmic notes. *Wojeno-Med. Jour.*, March, 1885, p. 123.

301. DEBIÈRRE, L. Un cas d'arthritide du coude dans le cours d'une d'ophthalmie. *Rev. génér. d'ophth.*, 1885, vol. iv., 7, p. 299.

302. LOPEZ. Encore le jequirity. *Rev. clin. d'ocul.*, 1885, No. 6, p. 137.

303. BENSON. Jequirity. *Trans. Ophth. Soc. Unit. Kingd.*, 1884, vol. iv., p. 15.

304. Brailey and Pigeon. Jequirity bacilli. *Ibid.*, p. 28.

305. Critchett and Juler. Conjunctival thickening. *Ibid.*, p. 30.

306. Cohn, H. On pemphigus of the conjunctiva. *Breslauer med. Zeitschr.*, 1885, No. 10.

307. Bäumler, E. Pemphigus of the conjunctiva and essential xerosis. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxiii., p. 329.

308. Bergmeister. Case of periodically recurring herpes of the iris, conjunctiva, and skin. *Anzeiger d. Gesellsch. d. Aerzte zu Wien*, 1885, No. 29.

309. Parisotti, O. Sur un cas d'épithélioma de la conjonctive bulbaire. *Rev. clin. d'ocul.*, 1885, No. 3, p. 81 ; No. 5, p. 272.

310 Campart. Cylindrome de la conjonctive bulbaire. *Bull. de la clin. nat. ophth.*, vol. iii., 1, p. 59.

311. Amat, Ch. Un sangsue dans le cul-de-sac conjonctival supérieur. *Gaz. méd. de Paris*, 1885, No. 18, p. 210.

312. Snell. Bony tumor of the conjunctiva. *Trans. Ophth. Soc. Unit. Kingd.*, vol. iv., p. 31.

According to the report of Uppenkamp (297) 246 cases of blennorrhœa neonatorum occurred from 1879 to 1884 at the lying-in asylum of the Berlin Charité. It did not occur much more frequently in primiparæ, but the danger of infection is increased by the length of the second period of birth, the birth of larger children, head-presentation, and artificial aid. Since the introduction of Credé's method in 1881 the percentage fell from 9.14 % to 0.9. In 1883 a 0.5 % was substituted for the 2 % solution, which had the same effect as the latter, but was not followed by the unpleasant conjunctival symptoms.

Oppenheimer (298) examined the vaginal secretion of a large number of pregnant women, and found Neisser's gonococci in 38 among 108 cases. He also investigated the conditions under which it will develop, and found that it possesses great powers of resistance against chemical reagents. He recommends Credé's method for prophylactic purposes.

Memosky (300) does not believe in the specific nature of conjunctival disease in general and particularly not of trachoma. He does not think that the bacterial origin of the latter has been proven. He cites cases in which combustion with lime produced marked granular conjunctivitis, and others in which trachoma was

the result of continued conjunctival irritation (for the purpose of simulation). He therefore thinks that trachoma is the result of continued irritation of the conjunctiva. HIRSCHMANN.

DEBIERRE (301) observed an acute inflammation of the elbow-joint in a girl who had acquired purulent ophthalmia by infection with the pus of blennorrhœa neonatorum. It began twelve days after the infection and was cured in three weeks. No other joints were affected. v. MITTELSTÄDT.

BENSON (303) found jequirity most efficacious in cases where the conjunctiva is hard and the so-called granulations are prominent and bloodless, and where there is a distinct tendency to ectropia and much pannus, especially in old-standing cases.

CRITCHETT and JULER (305) observed intense thickening of the conjunctiva, leading in the right eye almost to the obliteration of the upper and lower cul-de-sac, apparently due to an attack of "cold in the eyes" nine months previously. FITZGERALD.

COHN (306) describes a case of pemphigus of the conjunctiva in a child four years old, other parts of whose body were affected by the same disease. The conjunctiva of the right eye was slightly shrunken and covered with a thin, bluish, very transparent membrane, shreds of which could be easily removed. The cornea was partly grayish and opaque. The left eye had undergone similar but much more severe changes. The palpebral fissure was very much contracted in consequence of shrinkage of the conjunctival sac from below and from the side. The whole conjunctiva had a dull, bluish appearance. When the lids were drawn apart, marked syncanthus was found to exist on the outer side, the lids being united to the extent of about 4 *mm.* from the outer canthus. No vesicles were found anywhere upon the eye. Some time afterwards a few small vesicles appeared at the lower and inner margin of the cornea; also an infiltration. Treatment was of no avail.

BÄUMLER (307) describes two cases of essential xerosis of the conjunctiva in men thirty-nine and twenty-four years old respectively. Not the slightest trace of a pemphigus eruption could be found. The progress of the disease could not be checked, and vision was destroyed in consequence of ulceration of the cornea. The third case was that of a girl nine years old, whose whole body was covered with pemphigus vesicles. Essential xerosis ensued, and the child became totally blind.

In a patient who had been suffering for three years from periodically recurrent attacks of herpes of the iris and conjunctiva,

BERGMEISTER (308) found, besides the characteristic exanthema on both hands and the forearms, on the inner surface of both lids of the left eye in the tarsal portion, grayish-white, adherent, croupous membranes, extending from the margin of the lid to the fornix; the adjacent mucous membrane was injected, and there was catarrhal secretion and slight œdema of the lids.

PARISOTTI (309) reports a case of epithelioma of the conjunctiva of the globe. The neoplasm sprang from the inner sclero-corneal margin, had forced its way into the interior of the globe through the lymph-sheaths of the anterior ciliary arteries, and attacked the ciliary body, while the sclera had remained free.

MARCKWORT.

CAMPART (310) saw a tumor the size of a hazelnut, with nodular surface, which had developed in the conjunctiva between the insertion of the external rectus and the cornea. It was so soft that the lids could be closed. After it had been removed, its base was scraped clean and the conjunctival defect closed with sutures. It proved to be a cylindroma. v. MITTELSTÄDT.

AMAT (311) removed a living leech, 25–30 *mm.* long, from the upper fornix of a zouave, where it had been for several days. In the water with which the patient washed himself, several small specimens of oxyurus were found. v. MITTELSTÄDT.

SNELL (312) removed a tumor situated beneath the conjunctiva, between the cornea and external canthus. It consists of adipose and fibrous tissue, with a hard, central nucleus about the size of a large pea, which proved, on section, to be an excellent example of true bone. FITZGERALD.

313. JANY. Ulcus corneæ rodens. *Centralbl. f. prakt. Augenheilk.*, 1885, p. 162.

314. ROY, L. Quelques considérations sur la galvano-caustique chimique ou ciniselliсaustie. Application en chirurgie oculaire en particulier. *Rev. clin. d'ocul.*, 1885, No. 3, p. 57.

315. DIMMER, F. A case of formation of vesicles on the cornea. *Zeh. klin. Monatsbl. f. Augenheilk.*, vol. xxiii., p. 212.

316. FANO. Kératite consécutive. Pas d'amélioration par la solution d' atropine. Amélioration rapide obtenue par les bains de l'œil avec la solution d'acide borique. *Jour. d'ocul. et de chir.*, Jan., 1885, p. 4.

317. RÜCKERT, F. Contribution to the knowledge of the congenital opacities of the cornea. *Inaug. Diss.*, Leipzig, 1885.

318. PURTSCHER, O. Proposition in regard to the correction with glasses of certain errors of curvature of the cornea. *Arch. f. Augenheilk.*, vol. xv., 1, p. 68.

319. DAGUILLON. Contribution à l'étude du staphylome pellucide conique de la cornée. *Bull. de la clin. nat. ophth.*, 1885, 1. p. 60.

320. PROUFF. Prognostic de l'eczéma aigu de la cornée se developpant chez les jeunes enfants au cours de l'eczéma aigu (impétigineux) de la face. *Rev. clin. d'ocul.*, 1885, No. 4, p. 92.

321. KAURIN, ED. Om Fienlidelser hos de Spedalske ved Reknæs Pleiestiftelse. *Tidskrift. f. prakt. Med.*, vol. v., 5 and 6.

JANY (313) reports a case of rodent ulcer of both eyes in which iodoform was of no avail; the galvano-cautery, however, stayed the process.

DIMMER (315) saw a vesicle develop on the cornea after combustion with lime. The vesicle was removed; next day, the cornea was covered again with smooth, shining, and only slightly dull epithelium.

PURTSCHER (318) recommends modifications of cylindrical glasses for correcting certain kinds of irregular astigmatism.

Among the four cases of staphyloma pellucidum reported by DAGUILLON (319) only one was congenital; tension was not increased, rather diminished. The treatment consisted in touching the centre of the conus with the galvano-cautery, subsequent iridectomy for optical purposes, and, eventually, tattooing of the corneal opacities. v. MITTELSTÄDT.

KAURIN (321) discusses the treatment, by keratotomy, and its advantages in leprous nodules of the cornea. SCHJÖTZ.

322. BUNGE. Injurious influence of cocaine upon the cornea. *Zeh. klin. Monatsbl. f. Augenheilk.*, vol. xxiii., p. 402.

323. HENSE. Accidents attending the use of cocaine. *Centralbl. f. prakt. Augenheilk.*, 1885, p. 265.

324. PFLÜGER. Cocaine. *Ibid.*, p. 206.

325. TERRIER. Chlorhydrate de cafeïn en instillation dans l'œil. *Soc. de chir.*, Apr. 2, 1885.

After discussing the influence of cocaine upon the eye, PFLÜGER (324) remarks that under certain conditions even a 2 % solution may produce anæsthesia of the cornea for such a length of time as to lead to disturbances of nutrition as he observed in two cases.

BUNGE (322) observed in three cases after instillation of cocaine an epithelial defect, which disappeared in a few days under a compressive bandage. He also observed a parenchymatous opacity of the cornea under the antiseptic compressive bandage in six cataract patients a few days after the operation, and in another vesicular keratitis, which he also attributes to the cocaine.

HENSE (323) reports two cases in which intense nausea followed the instillation of cocaine ; in another the patient became delirious, and abscision of a prolapse of iris was followed by panophthalmitis.

TERRIER (325) used muriate of caffeïne (2 %) for removing a foreign body off the cornea, and succeeded in producing complete anæsthesia. (I prepared a cold saturated solution [there was a residue when 2:100 aq. was used] with muriate of caffeïne obtained from Merck, and experimented with it in removing foreign bodies from the cornea. Great pain was manifested when I touched the cornea, so that I was obliged to return to cocaine. REV.) MARCKWORT.

XII.—IRIS.

Chapters XII–XX. DR. NIEDEN.

326. FRANKE, E. Peculiar congenital anomaly of the iris, *C. f. A.*, vol. ix., p. 101.

327. HOSCH, FR. Experimental studies on cysts of the iris. *Virchow's Archiv*, vol. xcix.

FRANKE (326) saw a defect resembling a coloboma in the outer portion of the iris, without a corresponding one of the choroid and retina, and hopes that in future cases of coloboma attention will be paid to the entrance of the blood-vessels into the optic nerve.

HOSCH (327) has studied the development of cysts of the iris experimentally and found that hairs implanted with the root take hold in the tissue of the iris, while shreds of corneal epithelium unite with it and become smaller by absorption. Solid tumors formed from bits of conjunctiva, while cysts developed only from adenoid tissue. Cysts of the iris therefore are cysts of retention resembling atheromata.

XIII.—GLAUCOMA.

328. BIRNBACHER, AL. and CZERMAK, W. Contributions to the pathological anatomy of glaucoma. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 1, p. 297.

329. DOBROWOLSKY, W. Some ophthalmoscopic changes in the fundus in glaucoma. *Arch. f. Augenhk.*, vol. xv., p. 161.

330. HIRSCHBERG, J. A case of kyanopsia. *C. f. A.*, vol. ix., p. 141.

331. HIRSCHBERG, J. A case of delirium after iridectomy for glaucoma. *C. f. A.*, vol. ix., p. 175.

332. KAZAUROW. Extirpation of the N. infratrochlearis in ciliary pains and glaucoma. *Wratsch*, No. 16.

333. MULES. Sclerotomy. *Ophth. Rev.*, March, 1884, p. 129.

BIRNBACHER and CZERMAK (328) always found in glaucomatous eyes products of inflammation along the veins and especially along the vortical trunk and their scleral emissaries, and also around the veins of Schlemm's canal. The changes must be attributed to chronic periphlebitis and consecutive endophlebitis, producing constriction of the efferent ducts.

DOBROWOLSKY (329) observed comparatively often in glaucomatous eyes the occurrence of white stripes along the blood-vessels of the optic nerve and retina, the result of perivasculitis. In one case he saw the glaucomatous halo in shape of a dark-red ring around the optic nerve; it paled afterwards, and is probably a symptom of exudation into the choroid.

HIRSCHBERG'S (331) patient had been operated on both eyes for glaucoma, and suddenly saw every thing blue, a condition which lasted several months. The symptom was probably of cerebral origin.

KAZAUROW (332) divided the N. infratrochlearis in 14 cases of cillary pains of various origin, in 9 of which it either did not return at all or not until after a long time; in 4 the pain returned after a few days, though not with the same intensity. In one case (injury of the eye) the result was negative. Kazaurow performed this operation in 21 cases of glaucoma on 16 patients. In 4 cases the visual result was 0 (1 of hemorrhagic glaucoma and 3 of very advanced chronic glaucoma). In all the other cases there was a marked improvement of vision. There was also a perceptible diminution of the intraocular tension. In one case an enlargement of the contracted field of vision could be demonstrated with the perimeter. In three cases the pupils became smaller and reacted more promptly. The author does not as yet express any decided opinion on the permanency of the cures effected.

HIRSCHMANN.

MULES (333) advocates the performance of a small preliminary iridectomy with a broad needle and Tyrrell's hook, followed as soon as advisable by a large scleral section. FITZGERALD.

XIV.—SYMPATHETIC OPHTHALMIA.

334. BROWNE, EDGAR. Sympathetic ophthalmia. *Ophth. Rev.*, March, 1885, p. 65.

335. CAUDRON, V. Emploi des applications chaudes prolongées dans le traitement de l'ophthalmie sympathique. *Rev. génér. d'ophth.*, July, 1885, vol. iv., No. 7, p. 289.

336. FANO. Documents pour servir à l'histoire de l'ophthalmie dite sympathique. *Journ. d'ocul.* Feb. and April, 1885.

337. HANSEN GRUT. Exenteratio bulbi. *Hospitalstid*, 1885, No. 7.

338. MANOLESCU, N. Aniride et aphakie traumatiques à gauche. Iridochoridite sympathique a l'état chronique à droite. Nouveau procédé d'irido-ectomie. *Arch. d'ophth.*, vol. v., No. 3, May and June, 1885, p. 227.

BROWNE (334) suggests that possibly a great number of cases of sympathetic ophthalmia are due to a species of reflex irritation conveyed along the ciliary nerves, rather than to direct transmission along the optic nerve. The following facts are of great importance from this point of view : (1) That the injury above all others most likely to induce sympathetic mischief, is one involving the motor portion of the uveal tract or the nerves belonging thereto ; (2) that the main stress of the induced mischief falls on the same tract in the other eye. Conjunction of physiological function certainly implies intimate trophic relationship and vaso-motor independence. Injury and irritation at the periphery cause a greater or less degree of instability at the centres, and the conjugate centres being necessarily implicated, in their turn reflect the irritation to the region immediately under its governance. In the mildest degree this probably amounts to not more than vaso-motor paresis (perhaps intermittent), giving rise to transient hyperæmia ; in others the loss of inhibitory influence may be sufficient to cause fluid exudation, and, rising in severity, culminate in the production of soakage and cell infiltration. FITZGERALD.

In sympathetic inflammation, CAUDRON (335) mainly recommends long-continued applications of cataplasms, and reports five cases (irido-cyclitis, serous iritis, plastic iritis, and neuro-retinitis),

in which with their aid he obtained excellent results, besides resorting to the usual treatment (enucleation as soon as possible, mercury and occasional leeching). Caudron calls particular attention to the rapidity of the improvement at the beginning, and asserts that in former years, treatment without cataplasms either failed entirely or produced only slight improvement. He also discusses briefly the action of warm, moist applications, and the indications for enucleation and optico-ciliary neurotomy.

v. MITTELSTÄDT.

After a review of similar cases, MANOLESCU (338) reports an observation of aniridia and aphakia with absence of the ciliary processes, produced by a thrust of the horn of an ox. V with a correcting glass = Fingers at 9 *m*. In the left eye sympathetic ophthalmia had run its course, leaving good quantitative V. Manolescu performed two iridectomies on this eye, and then extracted the clear lens, according to Wenzel's method, with the aid of a spoon. Two months later he performed the following operation: A cataract knife with a curved edge was passed in, edge forward, at the upper outer margin of the cornea, through the cornea and iris, and the latter cut from behind. Another cut, meeting the first at an acute angle, apex outward, was made with the same knife in the iris, and after the anterior chamber had been opened at the opposite edge of the cornea with a very pointed cataract knife, the circumcised piece of iris was drawn out and cut off. In course of time a central, almost round pupil formed. V = fingers at 50 *cm*. on account of dense opacities of the vitreous. Manolescu reports four cases more in which he made use of this method, and lays particular stress on the ease with which the iris can be divided, and the sight reaction which follows. v. MITTELSTÄDT.

HANSEN GRUT (337) is no friend of enucleation. He has performed exenteration of the globe in thirteen cases, and strongly favors this operation. It has two important advantages: 1. The sides do not sink back, and the space beneath the eyebrow in particular is not materially altered. 2. The stump is freely movable and almost half the size of the eye. SCHJÖTZ.

XV.—LENS.

339. CUIGNET. Cataracte traumatique sans ouverture de la cristalloide. *Rec. d'ophth.*, April, 1885. Probably subluxation of the lens.

340. DEHENNE. De l'intervention chirurgicale dans la luxation du cristallin. *Union méd.*, 1885, No. 92, p. 26.

341. v. DUYSE (GAND). Deux cas d'erythropsie. *Rev. génér. d'ophth.*, May, 1885, vol. iv., No. 5, p. 197.

342. GALEZOWSKI. Du traitement de la cataracte. *Rec. d'ophth.*, June, 1885. Hygienic and prophylactic advice in cataract.

343. GALEZOWSKI. De la marche et du prognostic des cataractes. *Rec. d'ophth.*, May, 1885. Treats of the time required by the various kinds of cataract to ripen.

344. GIRARD. Hémorrhagies post-opératoires. *Rev. trimestr. d'ophth. pratique*, p. 1, April, 1885.

345. HAGEN TORN, O. Case of removal of the dislocated nucleus by a method differing from the usual one. *C. f. A.*, vol. ix., p. 176.

346. LANDESBERG, M. Contribution to the knowledge of traumatic psychosis after extraction of cataract. *C. f. A.*, vol. ix. p. 134.

347. MATHEWSON, A. A case illustrating the natural history of cataract. *Trans. Amer. Ophth. Soc.*, 1884.

348. NORDMANN, G. A. Om konstgjord starrmognad. Helsingfors, 1885.

349. PANAS. Opération de la cataracte par l'extraction. *Congres franç. de chir.*, 1885.

350. PROUFF, M. J. Capsulotomie simple avec le cystotome et capsulotomie croisée dans les cas de cataracte secondaire produits par les dépôts vitreux ou des opacités sur la capsule. *Rev. clin. d'ocul.*, No. 4, April, 1885, p. 89.

351. SCHMIDT-RIMPLER. The extraction of central rudimentary and dense secondary cataracts. *C. f. A.*, vol. ix., p. 161.

352. WALDHAUER, C., SEN. Two cases of punctate cataract. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 1, p. 249.

MATHEWSON'S (347) patient, a man eighty-four years old, had cataract on both eyes twenty years ago. The right eye was successfully operated. In the left, repeated attacks of iritis. Three years ago V suddenly returned in the left eye and with $\frac{1}{12} = \frac{20}{10}$. The lens had sunk into the vitreous and lay in the ciliary region. Repeated attacks of iritis followed, and finally the eye was enucleated on account of glaucoma (which yielded only temporarily

to eserine). On examination it was found that the lens had shrunken to 8½ *mm.* in breadth, and 1 *mm.* in thickness, and was loosely attached to the lower part of the ciliary body.

BURNETT.

WALDHAUER (352) observed two cases of punctate cataract among 900. The affection began at the end of the period of youth, in consequence of special exertions, without constitutional anomalies. Three eyes were operated, two by division and one by extraction, with good result. They were probably acquired choroidal cataracts. (The affection is probably not so rare as the author thinks.—REV.)

VAN DUYSE (341) reports one observation of erythropsia after extraction made by E. Meyer (Paris) and another made by himself. In the former it occurred four months, in the latter one and one half years after the extraction, in each case at intervals. It always began towards evening and had completely disappeared next morning. After a review of the cases thus far reported, he comes to the same conclusions as Purtscher. He thinks that peripheric irritation of the retina, as it occurs in aphakia, predisposes particularly to the phenomenon. v. MITTELSTÄDT.

According to DEHENNE (340) extraction of the dislocated lens should be attempted only when it lies in front of the iris. When it lies behind the latter, no endeavor should be made to remove it, as long as there is no pain. Should secondary glaucoma develop, the best policy is to remove a blind eye. Should the media and inner membranes not be affected, sclerotomy, and if that fails, reclination should be resorted to, enucleation only as a last resort.

v. MITTELSTÄDT.

In extracting dislocated nuclei HAGEN TORN (345) recommends gradual division of the membranes from the surface towards the interior, in order to prevent the rapid escape of the aqueous humor.

GIRARD (344) attributes the secondary hemorrhages in the two cases he reports to senile arterial changes, and therefore recommends careful examination of the whole arterial system, so that proper precautions can be taken. In one of the cases a preparatory iridectomy was made in the other eye after the first had been lost (by hemorrhage). Sympathetic iridocyclitis developed, but disappeared after enucleation of the blind eye. $V = \frac{6}{10}$ was obtained after extraction, although purulent infiltration of the cornea had begun. v. MITTELSTÄDT.

PANAS (349) like Chavemac, Galezowski, and Wecker, recommends extraction without iridectomy. The advantages of this method of operating are: less danger of loss of vitreous, less frequent occurrence of plastic iritis, less frequent incarceration of lens-masses in the corneal wound, better vision, and avoidance of disfiguration of the eye. MARCKWORT.

SCHMIDT-RIMPLER (351) proposes to extract central rudimentary and dense secondary cataracts by cutting around the central mass at its membranous periphery with a broad cataract needle, severing its connection with the ciliary body, and afterwards extracting it. The operation should be done under strong—for instance, electric—illumination.

In the two cases of LANDESBERG (346) attacks of mania began on the 2d day after extraction, which disappeared on the 4th, although the bandage had not been removed. Atropine does not seem to be responsible for these hallucinations.

NORDMANN (348) discusses the three methods of ripening cataract, with special regard for the senile cataract: division, iridectomy, and trituration of the cortex. Iridectomy and trituration of the cortex are much less dangerous than division. The efficiency of trituration and division is about the same, and much greater than that of iridectomy. The author thinks that trituration may be preferable in senile, nuclear, and possibly choroidal cataracts. He performs the operation with an india-rubber spatula, or with the lids (Panas). SCHJÖTZ

XVI.—VITREOUS.

353. HÄNSELL, P. Recherches sur le corps vitré. *Bull. de la clin. nat. ophth. des quinze-vingts*, Jan.–March, 1885, p. 18.

XVII.—RETINA AND FUNCTIONAL DISTURBANCES.

354. ANCKE, RICH. Contributions to the knowledge of retinitis pigmentosa. *C. f. A.*, vol. ix., p. 167.

355. FERRET. Contribution à l'étude de l'étiologie de la rétinite pigmentaire. *Bull. de la clin. nat. ophth. des quinze-vingts*, Jan.–March, 1885, No. 1, p. 32.

356. GOLDZIEHER. A remarkable ophthalmoscopic picture. *Wiener med. Wochenschr.*, 1885, No. 11.

357. LANDESBERG, M. Amaurosis due to retinitis albuminurica. *C. f. A.*, vol. ix., p. 106.

358. MOLARD. Amaurose double déterminée au début par une insolation prolongée, entretenue par la présence d'un tænia; symptomes nerveux sympathiques remarquables; traitement par l'écorce de grenadier; guérison ayant coincidé avec l'expulsion d'un tænia. *Rec. d'ophth.*, May, 1885.

359. PHILIPSEN, H. Om dur halvsidige Blindhed. *Bibliothek for Logen*, 1885, vol. xv., 3.

360. STORY, J. Hereditary amaurosis. *Ophth. Rev.*, Feb. 1885, p. 33.

361. TREITEL, TH. On hemianopsia and the investigation of the sense of light. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 1, p. 139.

362. TREITEL, TH. The positive central scotoma and the cause of the disturbance of vision in affections of the retina. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 1, p. 239.

GOLDZIEHER (356) observed in an amaurotic child a spot of metallic lustre at the macula lutea, of about twice the diameter of the papilla, with a large red spot in its centre 5 *mm.* in diameter. The child had rhachitis, and for six months had suffered from eclampsia. No hereditary influence could be shown.

ANCKE (354) reports seven cases of retinitis pigmentosa in young persons, in five of whom marked excrescences were observed confined to the optic ring. In three of them consanguinity (of the great-grand and grandparents respectively) existed, and some of the patients had not yet observed their hemeralopia. In one patient the disease was confined to one eye, the other being normal in all respects.

FERRET (355) calls attention to the etiological connection between intermittent fever and retinitis pigmentosa. Among five cases it occurred several times in the patients themselves, and it could always be demonstrated in the progenitors, especially the mother. v. MITTELSTÄDT.

STORY (360) says hereditary amaurosis is more correctly defined as optic neuritis resulting from hereditary and congenital predisposition. Leber's description was based upon the records of fifty-five cases occurring in sixteen families. Story has met with five cases, all in the one family; two of them were actually under his own observation. In both of these there was a central scotoma in each eye. The three other cases were stated by the first of these patients to have gone blind in the same way, "from the brain," as she termed it. From the history there appeared to be a strong nervous trait running through the whole family. FITZGERALD.

TREITEL's (361) investigations showed that hemeralopia is not due to a disturbance of the sense of light, but to one of adaptation. The underlying pathological changes are not to be found in the nerve-centres of vision, but probably in the retinal epithelium, from which the visual purple is derived.

TREITEL (362) performed a series of experiments in order to determine the cause of the difference in the decrease of vision in affections of the retina and optic nerve (central and color-scotoma). Under ordinary illumination the positive central scotoma is not distinctly perceived, and is not the result of hemeralopia, but an entoptic phenomenon, the patients observing a shadow of the hazy retina. In regard to color perception in these scotomata, blue is first to fail, then green, then red, which can be attributed to the shadow covering the cones of the affected part of the retina; the inherent color of the latter also affects the development of these anomalies. The characteristic of the disturbance of the color-sense in negative scotomata, and particularly in affections of the optic nerve, consists in the reduced power of recognizing certain pigments under the same visual angle, green, red, blue. The essential difference between affections of the optic nerve and retina, therefore, does not lie in the loss of the color-sense, but in the manner in which this loss develops.

In a comprehensive and carefully prepared paper on hemianopsia PHILIPSEN (359) first presents the bibliography of the subject, next discusses the anatomical conditions, and then reviews the historical development of our knowledge of hemianopsia. Philipsen, in his description of the nature of the affection generally, inclines to the views of the German authors. He cites about fifty cases. Homonymous hemianopsia he divides into three categories, according to the location of the lesion in (*a*) the tractus, (*b*) the thalamus and the adjoining parts of the capsula interna, and (*c*) the occipital lobe; he also calls attention to the different clinical symptoms of each category, from which the probable location of the intracranial location can be inferred. Philipsen assumes that median hemianopsia does not with certainty indicate a hemianopic affection, and that temporal hemianopsia must be attributed to a lesion at the base of the brain. (The latter assumption the *Rev.* does not indorse.) SCHJÖTZ.

XVIII.—OPTIC NERVE.

363. FUCHS, E. The peripheric atrophy of the optic nerve. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 1, p. 177.

364. HAADEL, MAX. Cases of genuine acute optic neuritis *Inaug. Diss.*, Berlin, 1885.

365. PARISOTTI and DESPAGNET. Fibrome du nerf optique. (Supplement au mémoire publié dans le numéro de Décembre.) *Rec. d'ophth.*, Apr., 1885.

366. VOSSIUS, A. On tumors of the optic nerve. *Berl. klin. Wochenschr.*, No. 13, 1885.

The examination of numerous optic nerves has convinced FUCHS (363), that in the adult atrophy of certain bundles of fibres of the optic nerve occurs as a rule, namely, those lying at the surface of the optic nerve, between the pial sheath and the peripheric septum, and those around the central blood-vessels. He found them in a state of gray atrophic degeneration, which, however, is not the result of inflammation, as Leber assumes, but must be considered a pathological product. The rapidity of development varies considerably, as does the extent at the different ages; the chemical and mechanical action of the lymph is probably of great influence on the development of the atrophy. In regard to the disturbances produced, proof must be brought that the extent of the blind spot is enlarged, and that there is a concentric contraction of the field of vision corresponding to the course of the affected fibres. This proof has not yet been furnished.

HAADEL (364) has prepared a report of nine cases of genuine acute neuritis observed at the clinic of the University of Berlin. The neuritis affected either one or both eyes, developed very rapidly, and extended to the neighboring retinal tissue. Cold is frequently assumed as the cause. Periostitis of the orbit could not be demonstrated with certainty. Prognosis very doubtful.

PARISOTTI and DESPAGNET (365) were able to confirm the diagnosis previously made (*Rec. d'ophth.*, Dec., 1884, and *A. f. A.*, vol. xv., rev. No. 1142) of fibroma of the optic nerve, by the autopsy.

In the case reported by VOSSIUS (366), exophthalmus slowly developed in a girl nineteen years old, followed by amaurosis due to atrophy of the optic nerve. Extirpation revealed a tumor of the optic nerve lying within the pyramid of muscles which had increased the nerve to four times its normal diameter. All its fibres had disappeared, and the tumor was found to be a myxosarcoma, like almost all of the forty-two tumors of the optic nerve hitherto reported. Recovery in six weeks, though the neoplasm had apparently not been cleanly removed from the foramen.

XIX.—INJURIES AND FOREIGN BODIES.

367. ASCHMANN, A. G. Contribution to the knowledge of the wounds of the optic nerve. *Inaug. Diss.*, Zurich, 1885 (Prof. Horner).

368. BERGER, E. Case of erythropsia after injury. *C. f. A.*, vol. ix., p. 140.

369. BERGER, E. A rare case of tolerance of a foreign body in the iris. *Wiener med. Blätter*, 1885, No. 6. A chip of stone *2mm* long had remained on the iris twenty-five years.

370. DIMMER, F. Case of injury of the eye with a sharp object. *C. f. A.*, vol. ix., p. 97.

371. v. DUYSE. Un cas de cysticerque du corps vitré. Quelques considérations sur l'extraction des cysticerques en général. *Ann. et bull. de la soc. de méd. de Gand*, 51 année 1885, 5e livraison du vol. lxiv. des Ann., 5e livraison du vol. lii. du Bull., p. 139.

372. GAYET et MASSON. Essai sur l'atrophie du globe oculaire. Lésions du tractus uvéal. *Arch. d'ophth.*, May–June, 1885, No. 3, vol. v., p. 205.

373. HALTENHOFF. Cysticercus in the eye. *Rev. méd. de la Suisse Romande, X.*, 1885, No. 2, p. 122. Report of a case.

374. WALDHAUER, C., SEN. Case of injury of the eye. *C. f. A.* vol. ix., p. 141.

ASCHMANN'S (367) paper was prepared from the large material which Horner puts at the disposal of his scholars with so great liberality. He finds that about 8 % of all cases of atrophy of the optic nerve are due to injuries, and reports two cases : in one the retina was torn from the papilla by a blow, fissure of the roof of the orbit, exophthalmus. Enucleation was performed on account of trophic ulcer of the cornea ; death during the narcosis. The ophthalmoscopic diagnosis was confirmed by the autopsy, and an abscess was found in the brain. In the second case the blow was struck with an umbrella, tearing off the inferior rectus muscle, and producing exophthalmus, hemorrhage into the retina and papilla, and amaurosis. Aschmann has compiled nineteen cases, and finds that injury of the optic nerve before the entrance of the blood-vessels is followed by simple atrophy, after their entrance by atrophy of the retina, and later pigmentation of the latter, while if the nerve is injured close to the sclera extensive extravasations on the papilla and in the retina, are the result.

DIMMER (370) reports a case of injury of an eye with a sharp object in a boy, where he observed the characteristic picture of the fundus described by Berlin. There was also a scotoma, the extent of which exceeded the area of opaque retina. The retinal opacity disappeared, but the scotoma remained. Afterwards the whole papilla became atrophic, but the limits of color perception remained normal in the upper half of the retina. Probably the lower part of the optic nerve had been directly injured.

BERGER (368) observed erythropsia in a slightly myopic person after severe injury in the region of the left zygomatic bone with a sword without contusion of the eyeball; there were, however, probably symptoms of temporary cerebral irritation. The erythropsia must be regarded as such.

WALDHAUER (374) describes a case of rupture of the sclera produced by a piece of wood, with prolapse of iris into the wound and vitreous into the anterior chamber. The latter went back under a compressive bandage. The lens remained clear.

GAYET and MASSON (372) describe in the continuation of their paper begun in the *Arch. d'ophth.*, vol. v., No. 2, p. 121, the changes in the uveal tract, the accommodative apparatus, the retina, and the refractive media in such atrophic eyeballs in which destruction of the cornea and escape of the lens had taken place either with or without loss of vitreous. The changes in form and position of the parts named are due to mechanical causes, shrinkage of the newly-formed tissue which had replaced the lost parts. For particulars see the paper itself. V. MITTELSTÄDT.

VAN DUYSE (371) reports a case of cysticercus in the vitreous in a man forty-one years old, a very rare occurrence in Belgium, with simultaneous presence of the tænia. Van Duyse attempted to remove it through a meridional section, after accurately determining its position. The iris-forceps was introduced several times after a repeated search with the ophthalmoscope, but failed. Recovery normal. As the opacity of the vitreous increased and V diminished, Van Duyse made one more attempt at removal, and as that also failed, he performed exenteration at once. The difficulty of the operation was much increased by the free mobility of the vesicle, and its failure was probably due to its dislocation by the escaping vitreous or the movements of the animal itself.

V. MITTELSTÄDT.

XX.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

375. BACCHI. Syphilis precoce des membranes profondes de l'œil. *Bull. de la clin. nat. ophth. des quinze-vingts*, Jan.–March, 1885, p. 40.

376. DEHENNE. Influence du traumatisme sur le paludisme en chirurgie oculaire. Communic. au congr. de chir., *Union méd.*, May, 1885, No. 61, p. 737.

377. DESPAGNET. Des troubles oculaires provoqués par le tænia. *Rec. d'ophth.*, May, 1885.

378. CAMPART et ST. MARTIN. De l'état de l'œil chez des cholériques. *Bull. de la clin. nat. ophth. des quinze-vingts*, No. 1. Jan.–March, 1885, p. 35.

379. MULES. Tubercle of the eye. *Ophth. Rev.*, Jan., 1885, p. 1.

380. OURSEL. Contribution à l'étude des affections oculaires dans les troubles de la menstration. *Thèse de Paris*, Feb., 1885.

381. ROMBRO. Intermittent fever complicated with amaurosis. *Russ. Med.*, No. 20.

382. v. SCHROEDER, TH. Case of amblyopia saturnina. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 1, p. 229.

383. PRIESTLEY-SMITH. Meningitis after enucleation. *Ophth. Rev.*, Feb. 1885, p. 39.

384. WEEKS, J. E. Case of abscess of the eyeball after meningitis. *C. f. A.*, vol. ix., p. 129.

MULES (379) gives a résumé of the results arrived at by various investigators, on the following subjects: (1) Tubercle developed in and around the eye as a primary affection; (2) the results of inoculation into the chambers of the eye, as an experimental and diagnostic study; (3) the development of intra-ocular tubercle as a growth secondary to its outbreak in other organs of the body. As regards treatment, Mules believes that tubercle of the eyelid may be treated constitutionally with a fair prospect of perfect recovery and exemption from constitutional affection. But when the globe is attacked enucleation is imperative.

FITZGERALD.

WEEKS (384) examined an eyeball taken from a child 12 years old, which had suffered from scarlet-fever followed by otitis and meningitis, in the course of which latter disease the affection of the eye developed. The eyeball was phthisical, and an abscess with caseous contents had developed in the lateral lower quadrant,

on the anterior surface of the sclera, beneath the conjunctiva, which was firmly united with it. A microscopical description ollows.

PRIESTLEY-SMITH (383) states, that he has seen two fatal cases of meningitis after enucleation, and another which nearly proved so but for the prompt measures which were adopted. In these cases the operation was performed during commencing panophthalmitis. During the last 12 months he has in every case of enucleation, been in the habit of putting iodoform powder into the wound as soon as the bleeding had ceased. The routine use of this together with the recourse to injections, whenever the thermometer showed any rise in temperature would, in his opinion, render panophthalmitis no bar to operation. FITZGERALD.

v. SCHROEDER (382) reports a case of amblyopia due to lead-poisoning in exudative neuro-retinitis with extravasation of blood into the retina and perivasculitis, complicated with paresis of the abducent nerve of both eyes. Rapid recovery under inunction and the use of iodide of potash. The visual fields, previously concentrically contracted, regained their normal extent. Bibliography follows.

BACCHI'S (375) cases were those of syphilitic persons, whose secondary symptoms had not been properly treated. In spite of energetic specific treatment their recovery was either not complete or affected with great difficulty. v. MITTELSTÄDT.

DEHENNE (376) observed the reappearance of intermittent fever in patients operated for cataract, who had suffered from it many years ago. The disease rapidly yielded to quinine.

In ROMBRO'S (381) case of intermittent fever there was almost total loss of vision during the daily paroxysms, which continued during the apyrexia. Completely cured with quinine in eight days. The eyes were not closely examined. HIRSCHMANN.

CAMPART and ST. MARTIN (378) report their observations of the eyes of cholera-patients during the last Paris epidemic. They found, besides great dryness of the conjunctiva and diminished secretion of tears, unevenness and ulcers of the cornea, opacities of the lens and vitreous. In most cases T was diminished, this symptom being absent only in rapidly fatal cases. It sets in at the beginning of the second period, the tension diminishing or increasing, in accordance with the favorable or unfavorable course. The lower portion of the conjunctiva was frequently injected on account of imperfect closure of the lids during sleep. The reac-

tion of the pupils was also affected. The retinal blood-vessels were blackish and could be clearly traced to the small capillaries. When the media were clear V was good, and colors were promptly recognized. v. MITTELSTÄDT.

In DESPAGNET'S (377) case disturbance of vision was produced by a tapeworm, after the removal of which sight was completely restored. MARCKWORT.

REVIEW.

Text-book of Ophthalmoscopy. By EDWARD G. LORING, M.D. Part I.—"The Normal Eye; Determination of Refraction, Diseases of the Media, Physiological Optics, and Theory of the Ophthalmoscope." Pp. 267, with 4 chromo-lithographic plates, containing 14 figures, and 131 wood-cuts. New York: D. Appleton & Co., 1886. Price $5.00. (Reviewed by Swan M. Burnett.)

The first impression one gets from this volume is pleasing. The dark-green cover, with its white title and red lettering, raises the hope that the same simplicity and good taste will be adhered to throughout the mechanical construction of the work. Nor does further examination lead to disappointment. The page is wide and ample, and the type and paper every thing that could be desired in a book of such a character.

This is the first text-book on ophthalmoscopy of at all an exhaustive character that has appeared in the English language, and for that reason, if for no other, it demands a careful examination at the hands of the profession to whom it is offered. The author, too, is one whose name will be indissolubly connected with ophthalmoscopic science, so long as refraction-ophthalmoscopes are used.

The first thought, perhaps, that will occur to the mind of the majority of readers, is one of comparison of this with the classical treatise of Mauthner. Outside of the mere scientific facts common to the subject, it would be hard to find two works more different in general character. The philosophical, and often tediously minute style of Mauthner is in striking contrast to the crisp, direct, and eminently practical manner in which the American author presents his matter. The virtues and faults of the two styles could not find a more fitting representation than in these two works, which also show forth in a marked manner the essential difference in the Teutonic and American mind. Leav-

ing the reader to follow out for himself in detail the thread of this thought, we will proceed to a more minute examination of the different chapters.

The first chapter is given up to some general remarks on the ophthalmoscope; examination by daylight, and the method of examination by artificial light, by means of the oblique illumination. This, and Chapter II., since they contain nothing new, or at variance with generally accepted opinions, do not need any further mention.

Chapter III. is devoted to the anatomy of the fundus of the normal eye, with illustrations borrowed for the most part from Gräfe and Sämisch.

Chapter IV. is given up to the consideration of the fundus of the normal eye as seen with the ophthalmoscope.

In regard to the color of the fundus, he is opposed to the view that it is due solely to the pigment layer, and holds that it is due to reflection from the blood contained in all the choroidal vessels combined, tempered by the pigment contained in the epithelial layer, but influenced to a far greater degree by that of the general stroma of the choroid. To this must also be added a certain amount of white light reflected from the sclera. The normal appearance of the retina and its various reflections are treated of in quite an exhaustive manner, but we fail to find any mention of the so-called "shot-silk retina," which, when present in a pronounced degree, offers one of the most striking appearances of the background when viewed directly by means of the mirror, unless he means it when in speaking of the aspect of the fundus of the young eye, he says: "The fundus is more brilliant in hue, and the various tissues have a greater transparency; the outlines of the nerve and vessels are sharper cut, while at the same time there is usually a greater development of connective-tissue elements, which are often shown by feathery if not glistening reflections from various parts of the fundus,—notably, along and over the course of the vessels, and around the region of the yellow spot." The marked appearance of the "shot-silk retina," as it sometimes manifests itself, particularly in deeply pigmented eyes, are of sufficient importance to the student to have merited a much less general description than that. A well-pronounced case could easily be mistaken for a pathological condition.

As regards the light streak on the retinal vessels, the summing up of the evidence thus far furnished, is that "no thoroughly

satisfactory and acceptable explanation of its presence has yet been given."

The fact emphasized as curious and unaccountable by Mauthner and others, that the halo around the macula is not visible by the direct method of examination, he considers as sufficiently explained by the enlargement of the upright image, which prevents the macula lutea being ever seen as a whole, and the weaker illumination under which it is seen.

The retina he rightly considers as in some manner reflecting the condition of the general nutrition of the body, and in this connection makes the following wise remark, with which the reviewer most fully agrees. "It is often important to bear in mind the discrepancy in young people, between the amount of labor imposed on the eye and the capacity, from imperfect nourishment or want of development, to fulfil it. If this were done there would be fewer glasses ordered of an almost imperceptible strength, and more tonics and a better regimen prescribed."

Anomalies of the fundus and media are treated of briefly, but in sufficient detail to enable the student to differentiate them from pathological conditions.

We are sorry to see that the author gives the support of his authority to the use of theword "conus" or "cone" to the white space, usually crescentic around the optic disc. This space has no resemblance to a cone, and the word has already a more fitting application to conical cornea. Its use in the sense of a crescentic atrophy around the disc has, to my own knowledge, led an expert bibliographer to classify an article on the coni in relation to refraction under affections of the cornea!

The 5th chapter is devoted to the determination of the optical conditions of the eye with the ophthalmoscope. In regard to the question of how far the total hypermetropia reveals itself under the ophthalmoscope, the author declares: "Without being able to accept, then, unreservedly Mauthner's general statement, that the total H can be invariably determined with the ophthalmoscope, we nevertheless believe, that a very close approximation to it can almost invariably be obtained, even where a spasm of the ciliary muscle exists," and he gives a number of cases in support of his opinion.

The following paragraph opening the section on the "Determination of Astigmatism," we think remarkable and not warranted by the facts.

"The determination of astigmatism by means of the ophthalmoscope, has always been considered one of the most difficult, and from its want of accuracy one of the least satisfactory applications of the instrument, and there is no doubt that it is, to a great extent, true. Still the difficulty in ascertaining the existence of astigmatism, and the uncertainty in establishing its degree, are, I think, due in a great measure to the method adopted, which has usually depended on the fact first pointed out by Knapp and Schweigger, that in astigmatism the disc is seen elongated in one direction with the upright image, and the opposite by the inverted."

In the first place, we do not believe that the determination of astigmatism is considered very difficult by most ophthalmoscopists, and we think there are few who do not rely on it largely as corroborative of the data furnished by other methods, and we know of some who claim that they can detect in any ordinary case an astigmatism of 0.5 D by the direct method. In the second place, we do not believe that the Knapp-Schweigger method is employed by any considerable number of ophthalmoscopic surgeons. Either the direct or indirect method, if properly employed, is alone better and more accurate than this combination—comparison method.

Of the direct method alone, he says: "The writer readily admits that this method is also, though by no means in the same degree, wanting in accuracy, and is not to be looked upon at all as a substitute for the trial by glasses, but to be used in co-operation with it." He thinks astigmatism as low as 0.75 D can be detected by this method.

The determination of ametropia by the direct method is treated of in full under the headings of several propositions, which include all possible states and conditions of the optical apparatus of the eye of the patient and examiner.

No description is given of that examination with the mirror alone known as the "shadow-test" (known also as keratoscopy, retinoscopy, etc.), which stands in such high repute among our British brethren. Such an omission from a text-book on the ophthalmoscope we deem unpardonable. It does not matter that "it remains, in his opinion, the most difficult and least satisfactory of any of the methods of determining the refraction of the eye"; it is a recognized method based on established scientific data, and some of those whose opinions are entitled to weight, who have

practised it, claim for it exactly those qualities which the author denies to it. We do not ourselves rank it high, but we certainly think that no text-book on the ophthalmoscope which proposes to offer the student the substance of all our existing knowledge on the subject, can be complete without an explanation, at least, of the phenomena on which it is based. He makes another curious mistake in stating that "Mr. Cooper dilated somewhat upon this method" in the plan of examining for astigmatism, which he proposed in 1872. Mr. Cooper's method consists in a successive examination of the inverted and erect image, without the intervention of an auxiliary lens, using a long focus mirror, which he held first at three or four feet from the eye and gradually advanced, using always the details of the fundus as the objects of examination, whereas in the shadow-test, the mirror remains at the same distance, and the object is the diffuse aërial image of the source of illumination.

Neither is any mention made of Schmidt-Rimpler's method of determining refraction by the inverted image. It is ingeniously devised, and, from a limited use of it, I should say, was quite practical, and is deserving of mention, if not of a full description.

In Chapter VI. we have a description of the methods of examining the condition of the media and of the different pathological states to be found. The author has evidently given a great deal of attention to examination by the oblique light and to the conditions which it reveals, and, as a result, we have in this chapter, which is, in our opinion, the best in the book, the most carefully studied consideration of alterations in the media to be found in ophthalmological literature.

In the appendix we have presented the fundamental principles of optics and the theory of the ophthalmoscope, and for a plain unmathematical explanation of the laws of optics and the properties of lenses it surpasses any thing with which we are acquainted. There is scarcely a formula in it, and those only of the simplest, and yet the principles are so clearly stated that a person entirely unacquainted with mathematics should have no difficulty in thoroughly understanding the elementary truths of optics and the action of lenses on light. We notice with regret that he sanctions the use of the word "dioptric." "Dioptric" is an adjective with a well-established meaning in our dictionaries, and it is confusing, not to say incorrect, to use it in the sense of a substantive, which has a meaning quite sharply defined of its own. The unit of refraction of the metre-lens is a "dioptry."

It is further unaccountable to us why he should accept 1 D as equal to 36″ focus. Most of the lenses used in this country are ground to the English inch, of which there are 39.37 to the metre, and it would be much nearer the truth, and in keeping with a more generally accepted practice, to consider 1 D = 40 inches focus. But even if the French inch is used, 36 is not perfectly accurate, for with the index of refraction of the glass generally used in manufacturing lenses (1.53 instead of 1.5), a lens having a radius of 36 inches will have a focal distance of only 34 inches, and in order to have a focus of 1 metre its radius must be 37 French inches.

We had marked other passages in our reading for notice, but our space is limited, and we think we have given enough to show what the work does and does not contain. The second part, which, we trust, may not be long withheld from us, is looked for with interest.

In conclusion we notice the chromolithographs which illustrate the various ophthalmoscopic appearances described. They are among the best that have been made in this country, which, after all, is but faint praise. When one compares them with the beautiful plates that illustrate the transactions of the Ophthalmological Society of the United Kingdom one cannot help wishing that the publishers had been unpatriotic enough to have their plates made in London. The first plate that we looked for was the one representing the fundus of the astigmatic eye as seen by the direct method. Dr. Loring's is better and more nearly accurate than Jäger's, but even it is far from true. The general vertical streakiness is well given, but the difference in the distinctness of outline between the vertical and horizontal vessels is not sufficiently marked. It was an opportunity for making a true and striking picture which, we are sorry, was not properly taken advantage of.

The price ($5.00) is such, we are afraid, as to keep the book out of the hands of those to whom it will be of most benefit.

MISCELLANEOUS.

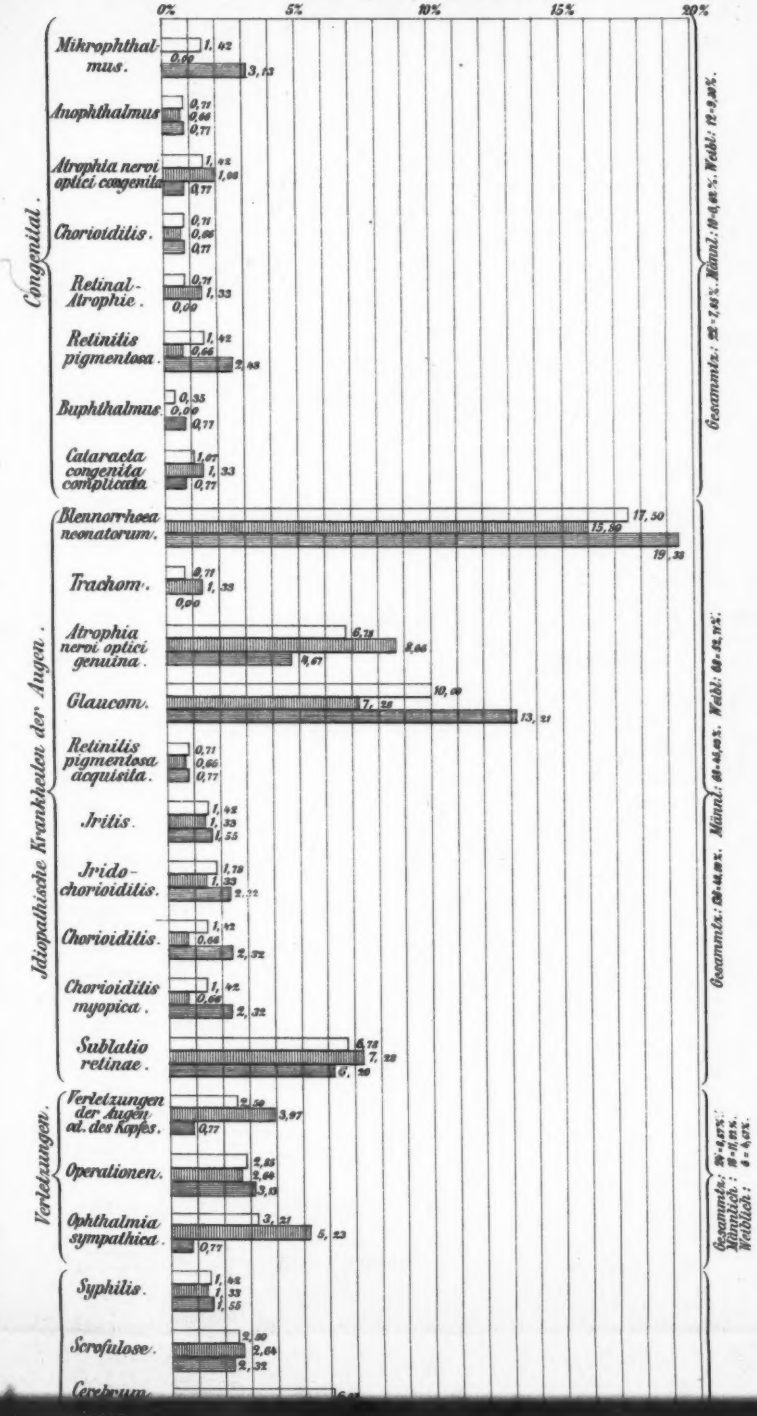
The health of Prof. HORNER has improved, but he has resigned his professorship at the University of Zurich as well as his position as attending oculist at the hospital.

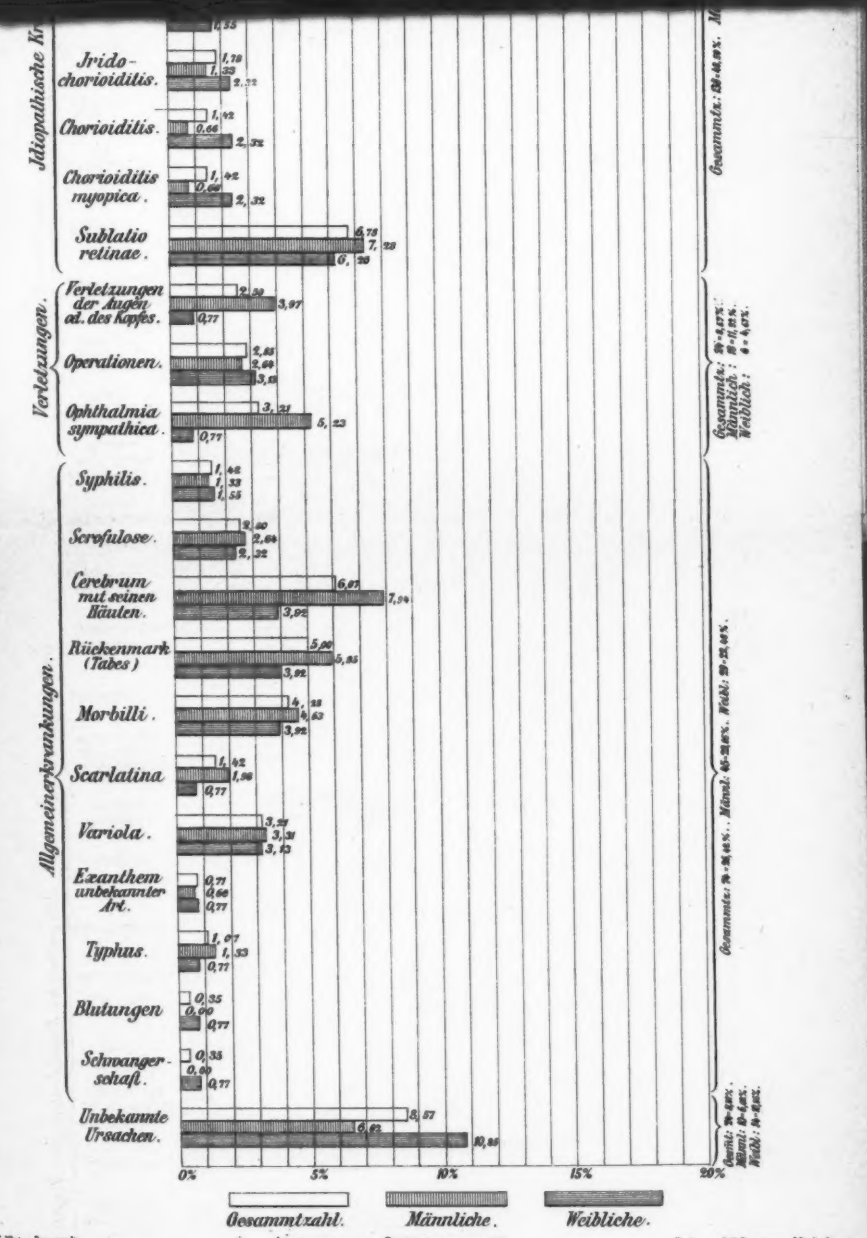
Prof. SATTLER (Erlangen) has been appointed Professor of Ophthalmology at the University of Prague, and will begin his lectures there this spring. For his position at Erlangen Dr. EVERSBUSCH, of Munich, and Prof. DEUTSCHMANN, of Göttingen, have been proposed.

Dr. KÖNIG (16 Neue Wilhelmstrasse, Berlin, Germany), who assisted Prof. v. HELMHOLTZ in the preparation of the new edition of his "Physiologische Optik," solicits reprints from all those that have published papers on physiological optics since the appearance of the first edition of Helmholtz's book.

Graphische Darstellung der Erblindungs-Ursachen der 280 in Breslau ortsanwesenden Blinden, sowohl der ständig wohnhaften, als der sich nur zeitweise daselbst aufhaltenden. (151 männl: 129 weibl:)

Maafsstab: 4 mm = 1%.


0%
5%
10%
15%
20%
Congenital.
Mikrophthalmus. 1,42 0,00 3,13
Anophthalmus 0,71 0,66 0,77
Atrophia nervi optici congenita 1,42 1,66 0,77
Chorioiditis. 0,71 0,66 0,77
Retinal-Atrophie. 0,71 1,33 0,00
Retinitis pigmentosa. 1,42 0,66 2,48
Buphthalmus 0,35 0,00 0,77
Cataracta congenita complicata 1,07 1,33 0,77
Gesammts.: 12-13,8%. Männl.: 11-14,6%. Weibl: 12-13,2%.
Idiopathische Krankheiten der Augen.
Blennorrhoea neonatorum. 17,50 15,89 19,38
Trachom. 0,71 1,33 0,00
Atrophia nervi optici genuina. 6,78 8,66 4,67
Glaucom. 10,69 7,28 13,21
Retinitis pigmentosa acquisita. 0,71 0,66 0,77
Iritis. 1,42 1,33 1,55
Irido-chorioiditis. 1,78 1,33 2,32
Chorioiditis. 1,42 0,66 2,32
Chorioiditis myopica. 1,42 0,66 2,32
Sublatio retinae. 6,78 7,28 6,29
Gesammts.: 32-34,8%. Männl.: 31-41,4%. Weibl: 33-32,1%.
Verletzungen.
Verletzungen der Augen od. des Kopfes. 2,50 3,97 0,77
Operationen. 2,85 2,66 3,13
Ophthalmia sympathica. 3,21 5,23 0,77
Gesammts.: 8-8,2%. Männlich.: 11-11,4%. Weiblich.: 4-4,6%.
Syphilis. 1,42 1,33 1,55
Scrofulose. 2,50 2,66 2,32
Cerebrum.

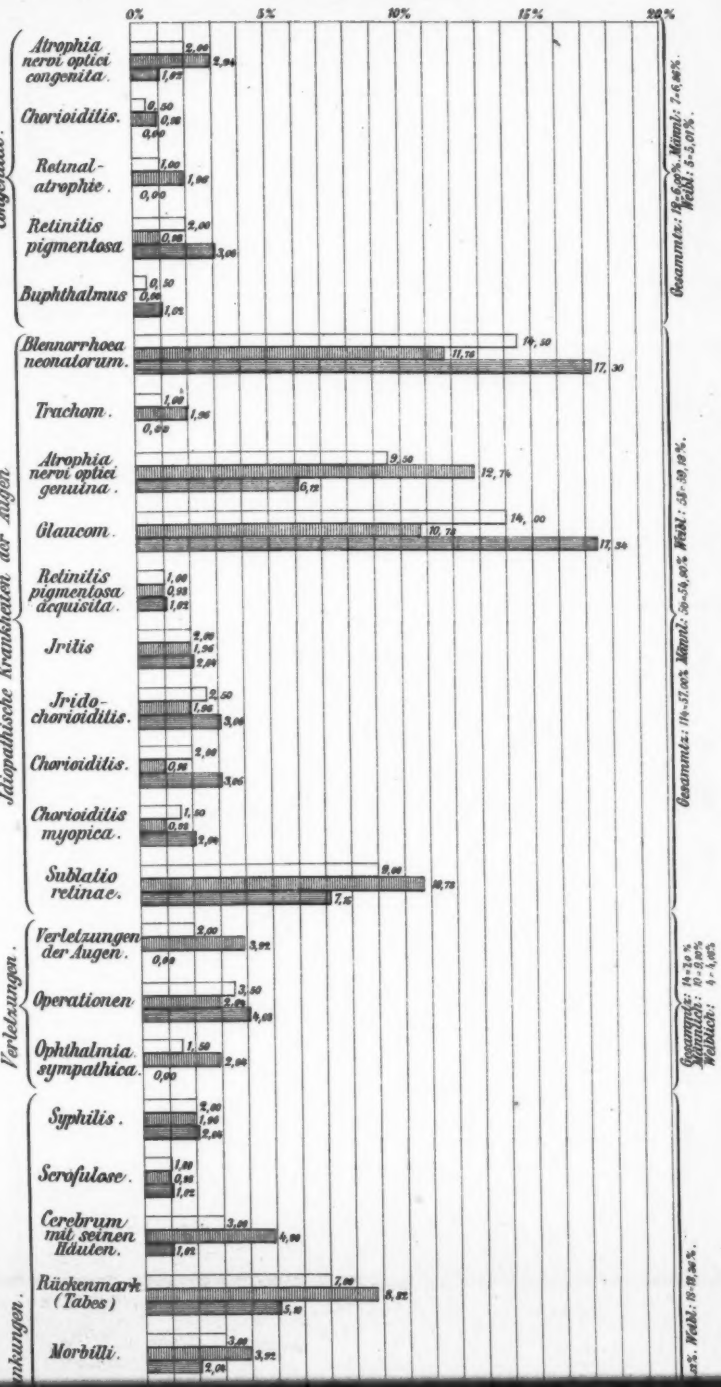


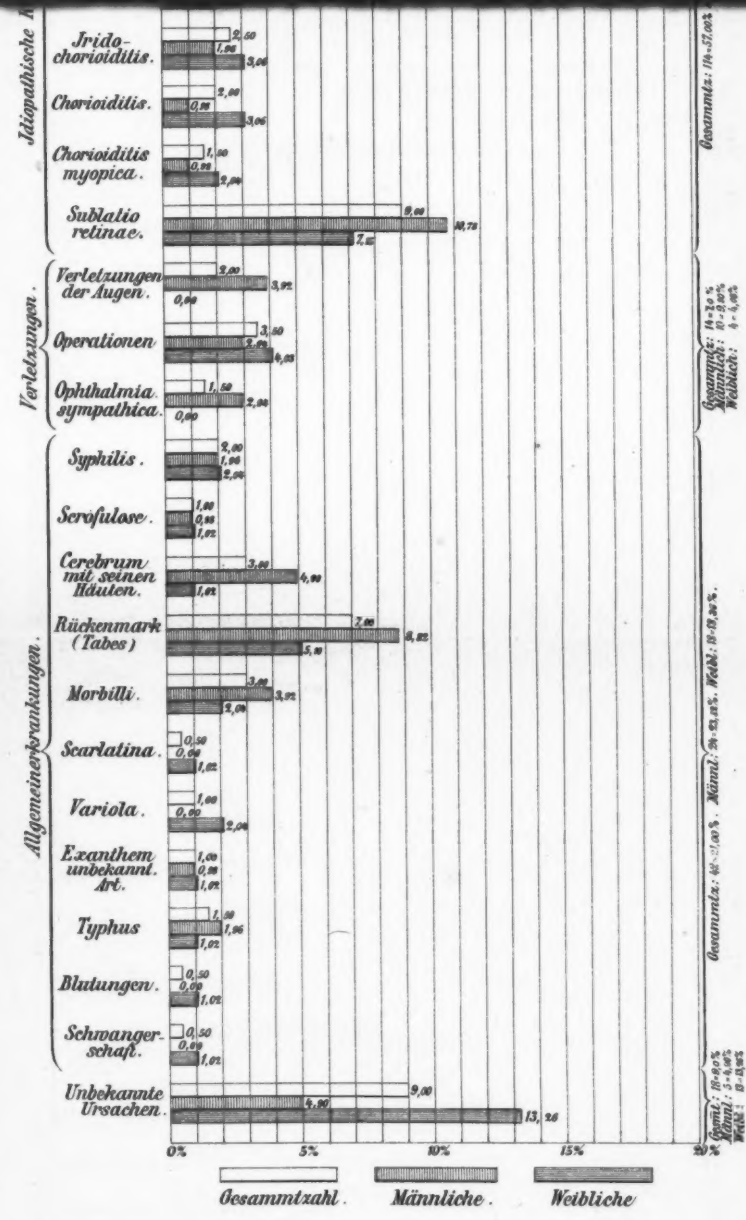
Druck v. F. Wirth, Darmstadt.

Verlag v. J. F. Bergmann, Wiesbaden.

Graphische Darstellung der Erblindungs-Ursachen der 200 in Breslau ansessigen Blinden. (102 männliche, 98 weibliche.)

Maafsstab: 4 mm = 1%.



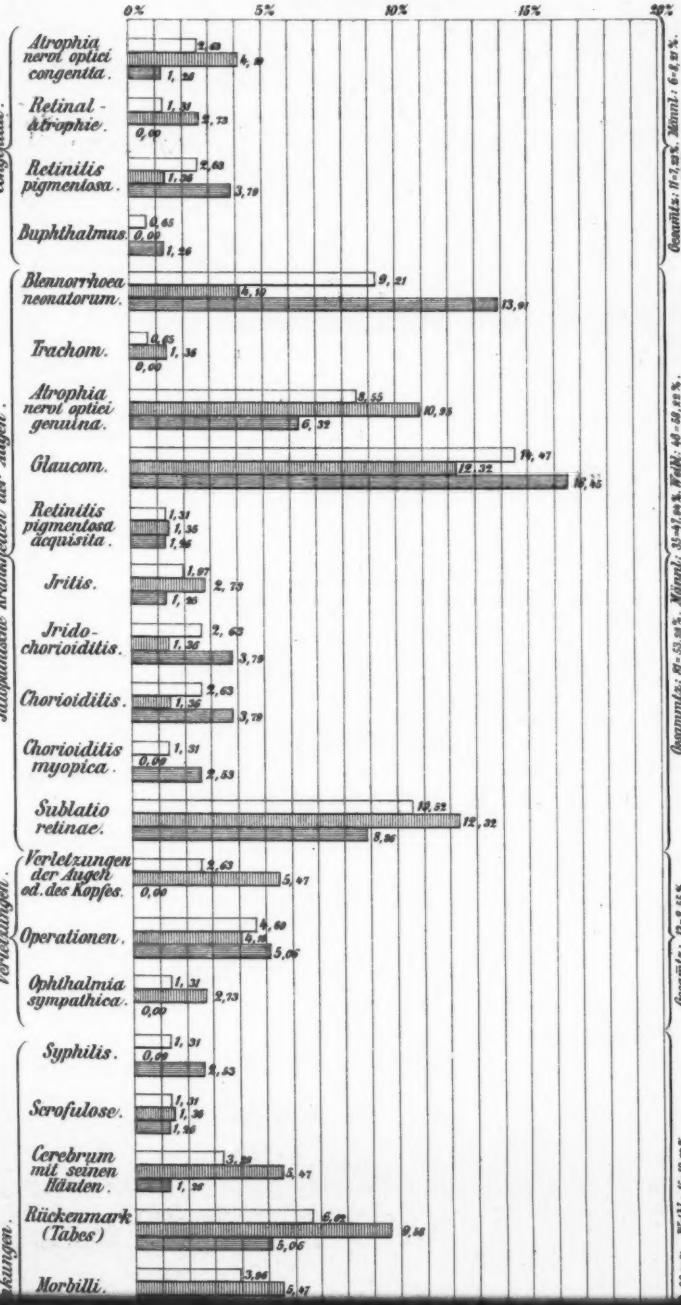


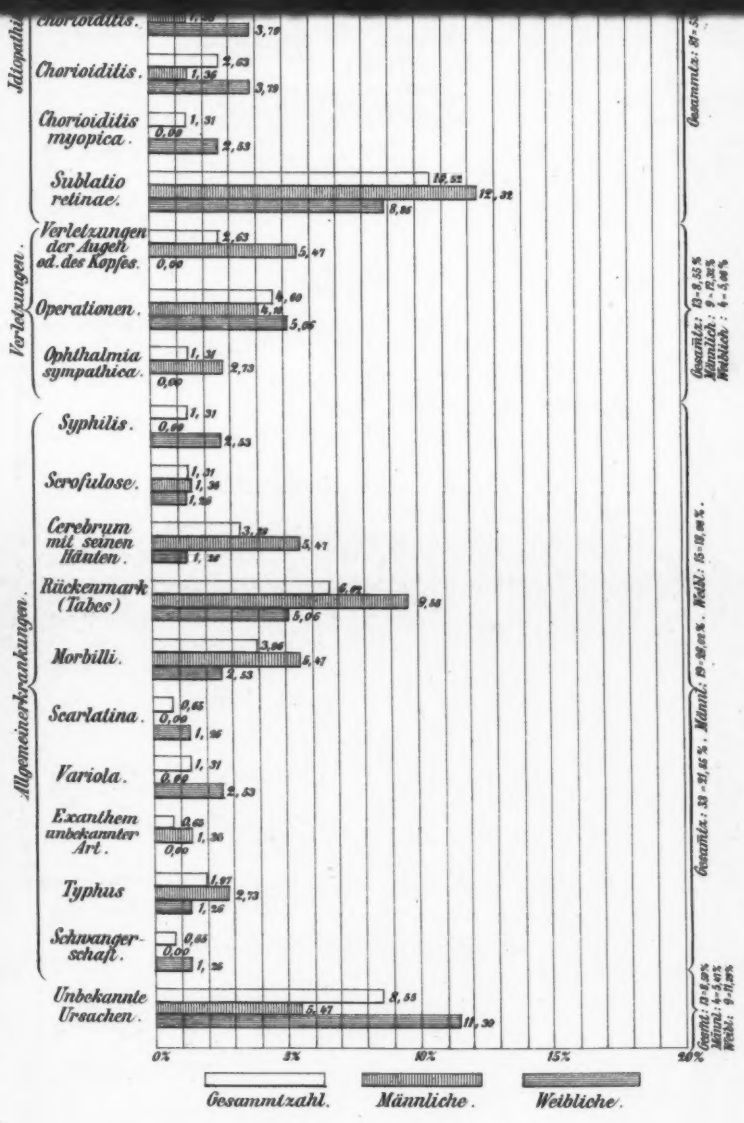
Lith. Inst. v. F. Wirtz, Darmstadt.

Verlag v. J.F. Bergmann, Wiesbaden.

Graphische Darstellung der Erblindungs-Ursachen der 151 in Breslau Erblindeten. (72 männliche, 79 weibliche)

Maafsstab: 4mm = 1%.





ARCHIVES OF OPHTHALMOL. XIV.

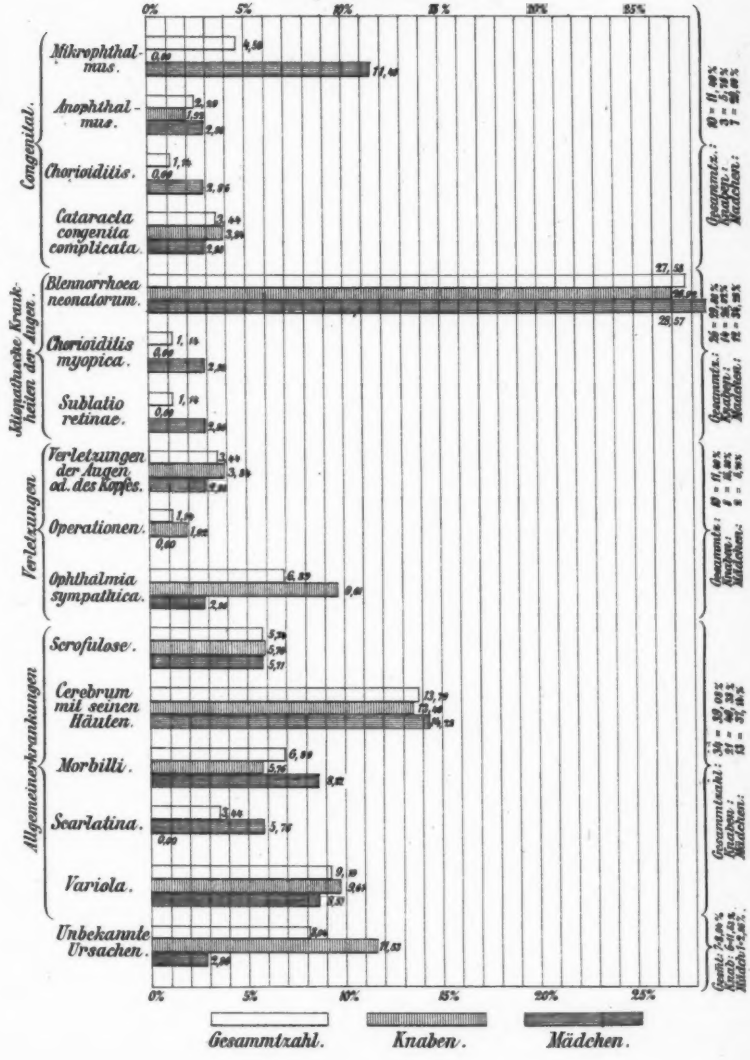
F. Wirth, Darmstadt.

Verlag v. J. F. Bergmann, Wiesbaden.

Graphische Darstellung der Erblindungs-Ursachen der 87 Zöglinge des Schlesischen Blindeninstituts zu Breslau.

(52 Knaben, 35 Mädchen)

Maafsstab: 3mm = 1%.

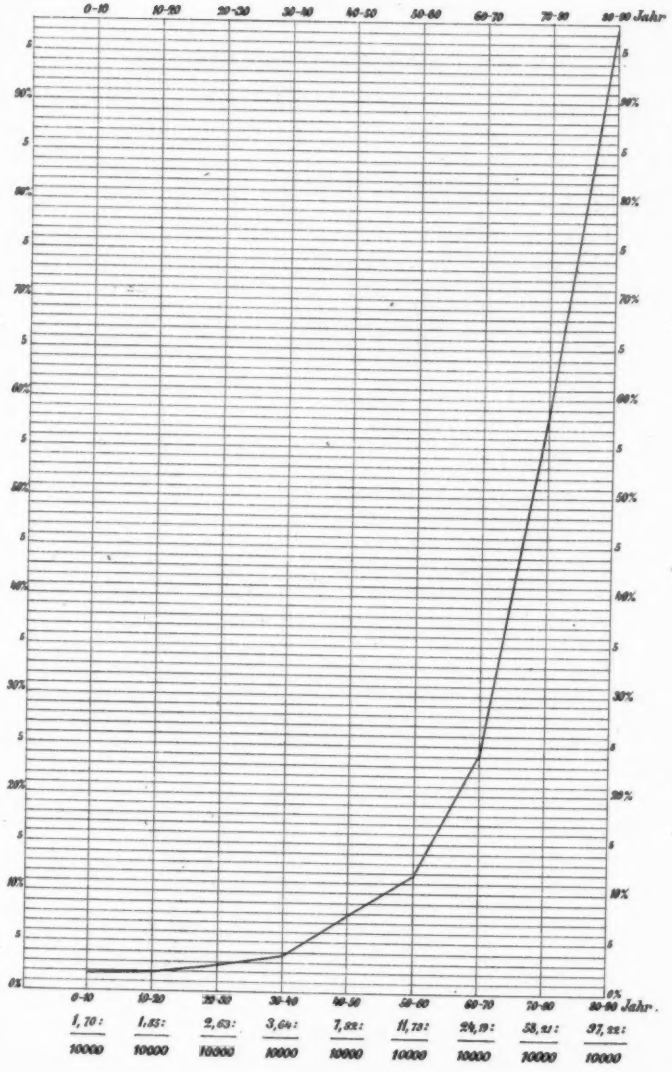


Lith. Anst. v. F. Metz, Darmstadt.

Verlag v. J. F. Bergmann, Wiesbaden.

A. Graphische Darstellung der Gefahr des Blindseins für die einzelnen Altersklassen.

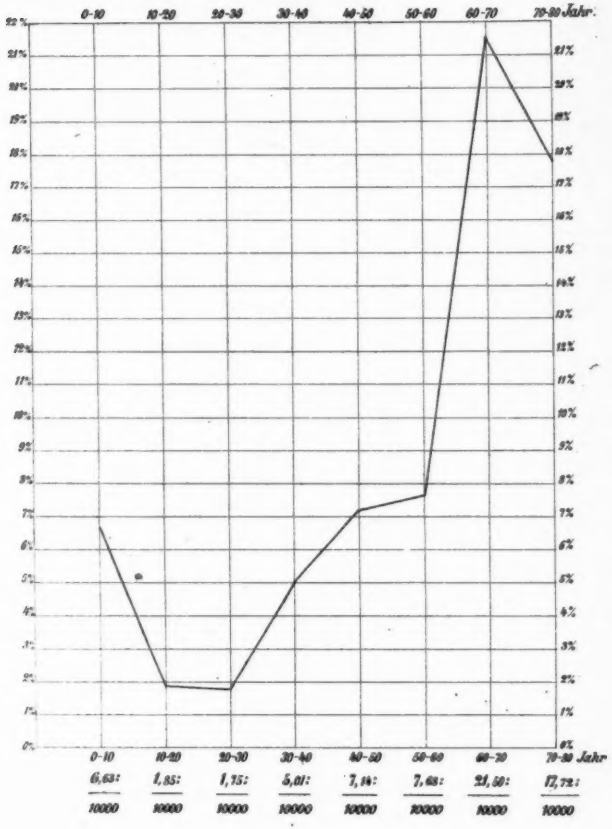
Maafsstab: 1½ mm = 1%.



Verlag von J.F. Bergmann, Wiesbaden.

B. Graphische Darstellung der Gefahr des Blindwerdens für die einzelnen Altersklassen.

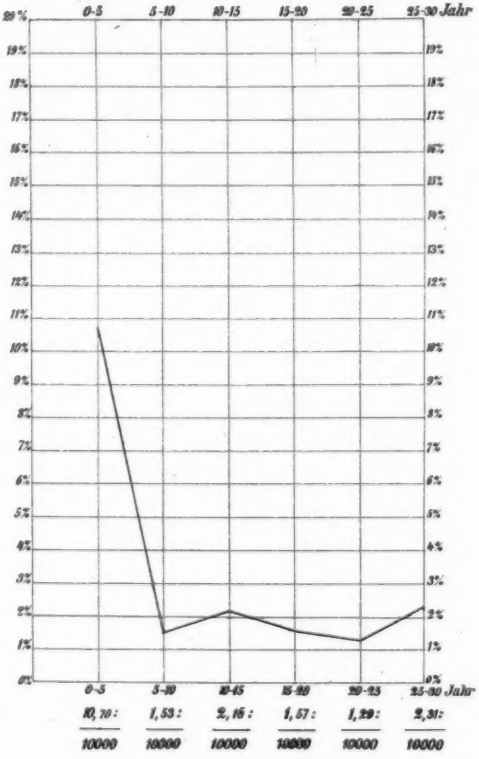
Maaßstab 5 mm = 1 %.



Verlag v. J. F. Bergmann, Wiesbaden.

C. Graphische Darstellung der Gefahr des Blindwerdens für die Altersklassen von 1-30 Jahr.

Maafsstab 5mm = 1%.



Verlag v. J. F. Bergmann, Wiesbaden.

Fig. 1.

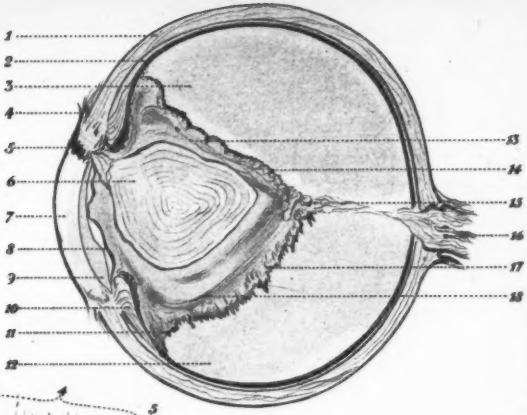


Fig. 2.

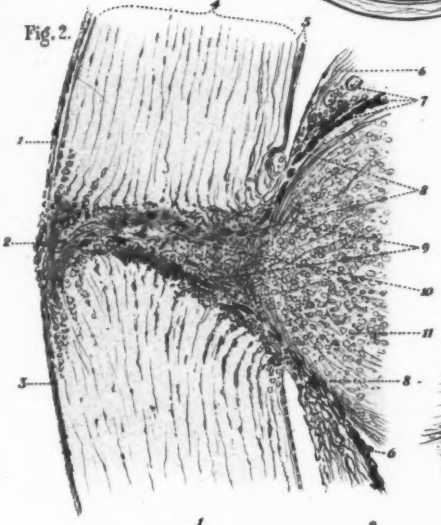


Fig. 4.

Fig. 5.

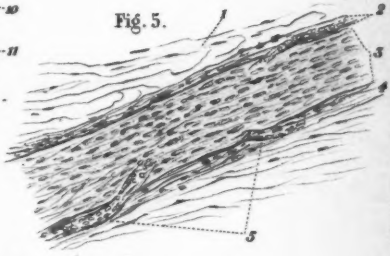
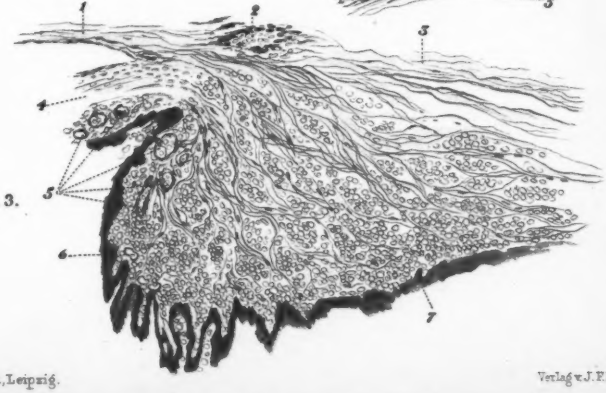


Fig. 3.



Lith. Anst. v. C. Kirst, Leipzig.

Verlag v. J. F. Bergmann, Wiesbaden.

Fig. 1.

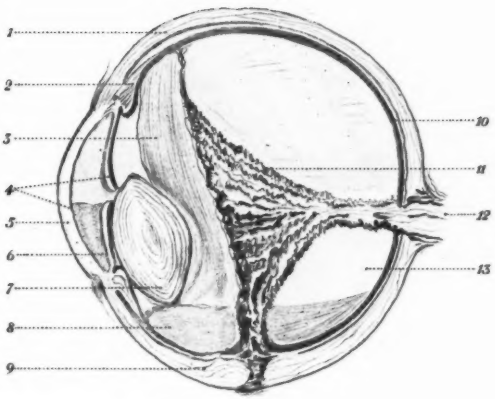
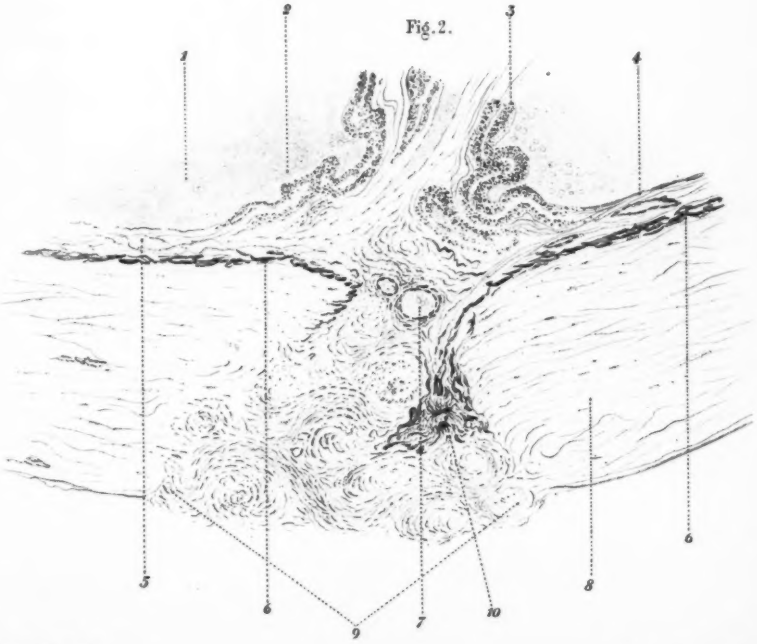


Fig. 2.



Lith. Anst. v. C. Kirst, Leipzig.

Verlag v. J. F. Bergmann, Wiesbaden.